

# Health Impact Assessment of Kentucky's Affordable Housing Tax Credit

---

2022



DEPARTMENT OF  
PUBLIC HEALTH  
AND WELLNESS



# TABLE OF CONTENTS

## **Executive Summary 4**

Key findings 4

## **Recommendations 4**

## **Introduction 7**

## **Scoping 8**

Advisory Group Organizations 8

The proposed Kentucky Affordable Housing Tax Credit Program 8

Who is impacted by the bill? 9

Kentucky residents in need of housing 10

Potential health outcomes related to housing access 11

How does the Federal LIHTC Work? 12

## **Assessment 13**

Kentucky's Affordable Rental Housing Shortage 13

Louisville/Jefferson County's Affordable Rental Housing Shortage 15

Impact of the COVID-19 Pandemic on rent burden 15

## **Qualitative Research Summary 17**

## **Literature Review 20**

Impacts of economic stability on individuals and families 20

Environmental conditions inside the home and across the community 21

Mapping Environmental Data 23

Housing and Mental Health Impacts 27

Assessing the Affordable Rental Housing Shortage 30

Impacts of Housing Tax Credits on the Local Community 31

Potential Economic and Fiscal Impacts of Tax Credits 37

Will the Proposed Kentucky LIHTC Improve Housing Cost Burdens in Kentucky? 40

## **Recommendations 41**

Investments in Kentucky's Affordable Housing Market 41

Design of affordable housing units 41

Increase access to and awareness of affordable housing 42

Ongoing research and evaluation of affordable housing programs 42

## **Discussion 43**

## **Appendix 44**

## **References 45**



# Executive Summary:

Quality affordable housing is critical to the health and wellbeing of Kentucky's residents. Affordable housing expands family budgets to afford more nutritious food, medical care, and utilities.<sup>1-3</sup> It can help families move from unhealthy environments with mold and lead paint to one that is clean and free of contaminants.<sup>4,5</sup> It can also have a strong impact on the mental health of residents.<sup>6-9</sup> Clean, safe, stable housing alleviates depression and anxiety, and can also create stability for a person in recovery with substance use disorder (SUD).<sup>10</sup>

Research suggests that low-income housing tax credits (LIHTC), a type of program that expands the development of affordable housing units, can have a positive impact on a community's economic development.<sup>11-14</sup> Direct investments not only influence local taxes and wages, but the embodied cost of affordable housing includes a reduction in health care costs resulting from poor housing and care of SUD.<sup>10,15</sup>

This Health Impact Assessment (HIA) reviews HB 86 Kentucky's proposed Affordable Housing Tax Credit, a program intended to increase the number of affordable housing units available to individuals earning up to 60% AMI of the area median income (AMI). With a current shortfall of 75,000 units for low-income families seeking housing, the estimated 6,560 additional units from the \$12.5 million in tax credits allocated each year for five years (\$62.5 million) could make a considerable impact.<sup>16</sup> It is important to recognize, however, that Kentucky's housing needs are broad. Among households with AMI's less than 50%, (very low-income), housing cost burden continues to be significant and affordable units are scarce. Comprehensive housing investments, including affordable housing tax credits, can create positive movement towards the alleviation of Kentucky's housing crisis.





## Key findings:

### Kentucky has a significant shortage of affordable housing.

- Almost a half-million Kentucky renters are housing cost burdened meaning that they pay over one-third of their income on housing.<sup>17</sup>
- For every 100 households at 50% AMI, there are only 81 units available. For every 100 households below 30% AMI there are only 54 units available.<sup>18,19</sup>

### Affordable housing affects a family's economic stability.

- When families have a high housing cost burden, they cannot afford necessities like food, utilities, and medical care.<sup>1-3</sup>
- Access to affordable housing can improve spending on other needs like food, maintaining a comfortable climate in the home, and filling prescriptions.<sup>20</sup>

### Affordable housing can reduce exposure to environmental hazards.

- Safe, quality affordable housing can reduce exposure to mold, lead paint, and indoor allergens.<sup>4,5</sup>
- Well-sited affordable housing can reduce exposure to brownfields, traffic, and other sources of air pollution.<sup>21,22</sup>

### Affordable housing affects mental health.

- Chronic housing instability and homelessness can cause high levels of stress and anxiety.<sup>6-9</sup>
- Children need quality stable housing in order to thrive.<sup>23,24</sup>
- Stable housing is required for successful recovery from substance use disorder (SUD).<sup>15</sup>

### Affordable housing developments can affect the local economy.

- Construction of affordable housing units can increase property values and increase economic activity in the surrounding neighborhoods.<sup>11-14</sup>
- Improved access to affordable housing can reduce embodied costs of care for the unhoused as well as those experiencing SUD. Access to housing can lead to a reduction in trips to the emergency room as well as a reduction in SUD expenses.<sup>25-28</sup>





# Recommendations

Recommendations to improve the health and wellbeing of Kentuckians through improved access to affordable housing include the following:

Expand housing for Kentucky residents earning up to 60% AMI	Expand housing programs for lower income families	Address Rehabilitation vs. New Construction	Invest in retrofits for seniors
Kentucky's affordable housing market for individuals earning up to 60% AMI is insufficient. Tax incentives would help promote construction for a critical part of Kentucky's affordable housing spectrum.	Some of the greatest gaps in housing affordability are for families below 30% AMI. Additional programs and subsidies are needed to extend the health benefits of affordable, stable housing to our most vulnerable Kentuckians.	Incentivize new construction in areas where the population served by LIHTC has the most need and incentivize rehabilitation in areas where existing housing supply for that population is comparably more adequate.	Retrofitting housing for seniors can also allow residents to age in place.







## Design of affordable housing units.

### Address sound proofing in affordable housing units.

Some existing affordable housing complexes have little soundproofing between units. The lack of soundproofing can create stress within the home and between neighbors.

### Address access for those with disabilities.

Kentucky has a lack of affordable housing units for people with disabilities. Additional accessibility concerns include a lack of ramps for affordable housing locations, and insufficient parking for the number of handicapped units in a development.

## Increase access to and awareness of affordable housing

### Improve outreach around affordable housing options to individuals making less than 60% AMI.

Affordability may continue to be a concern once an individual has access to a LIHTC unit. Increasing awareness of additional financial support programs may help create stability for individuals with limited incomes.

### Increase communication to improve affordability of housing.

Public housing and LIHTC run through different funding streams and often different departments both at state and local levels. Increasing communication between these entities and finding ways to improve access and information for residents can help make the continuum of affordable housing more seamless.

### Increase awareness of benefits of affordable housing along the continuum.

Not all residents are aware of the need for and benefits of affordable housing for all residents. Increasing community awareness of Kentucky's housing needs can help build support for additional programs and developments.

## Ongoing research and evaluation of affordable housing programs

### Expand data available on LIHTC developments.

Publishing data to examine how developments address environmental factors and evaluating the impacts of including these criteria can help ensure that health benefits are realized.

### Continue to research how affordable housing investments can be best leveraged.

Within the research, there is not consensus on whether situating LIHTC developments in low-income compared to high-income neighborhoods may yield the most benefits to individuals and communities. There is also more information needed on how to best increase access to affordable housing without creating displacement.



# Introduction:



Stable, affordable housing is foundational for good health. When housing is affordable, residents have the financial resources required for other necessities including food, utilities, and medical care. Housing that is free of health hazards such as mold or pests can also positively impact wellbeing. Kentucky's affordable housing market, however, is insufficient to meet the needs of its residents. Kentucky is currently short 75,000 affordable housing units and the demand continues to grow with consistent increases in housing prices.<sup>29</sup>

One measure intended to expand the number of affordable housing units is the creation of a state-wide Low Income Housing Tax Credit (LIHTC), a public/private partnership that encourages developers and private investors to invest in the construction of affordable housing units.

A low-income housing tax credit policy, HB 86, filed for Kentucky's 2022 legislative session by Representative Randy Bridges and Representative Kim Banta, has a goal of doubling the number of affordable housing units across the commonwealth by matching existing federal tax credits. While there is a broad spectrum in the types of affordable housing (emergency housing, transitional housing, long term housing) this bill focuses specifically on the creation of more affordable housing units for those with incomes up to 60% area median income (AMI).

Kentucky's critical shortage of affordable units for working families, seniors, veterans, those aging out of foster care, and those recovering from substance use disorder (SUD), creates barriers to economic stability and can impact the wellbeing of both children and adults. With housing challenges at the forefront of the pandemic, the Center for Health Equity (CHE) at the Louisville Metro Department of Public Health and Wellness (LMPHW) determined that a Health Impact Assessment (HIA) on a Kentucky affordable housing tax credit was warranted. As defined by the CDC:

*HIA is a process that helps evaluate the potential health effects of a plan, project, or policy before it is built or implemented. HIA brings potential positive and negative public health impacts and considerations to the decision-making process for plans, projects, and policies that fall outside traditional public health arenas, such as transportation and land use. An HIA provides practical recommendations to increase positive health effects and minimize negative health effects.<sup>30</sup>*

Through the stakeholder-driven process, HIA places health at the center of decision-making, working to ensure that it is not overlooked by the legislative process.

# Scoping

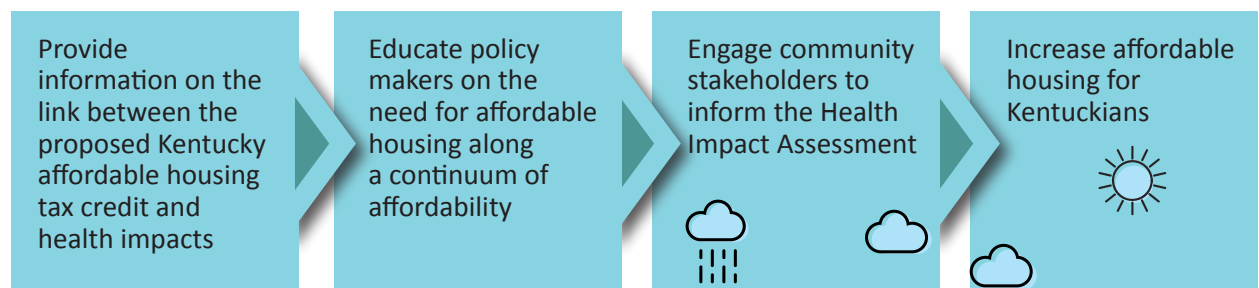
The scoping process of this HIA determined the breadth of research to be covered, the populations impacted, and the identification of stakeholders for qualitative research. This process was determined by an advisory group representing housing advocates, state housing coordinators, and public health practitioners.

## Advisory Group Organizations

Broken Hearted Homes Renter Association	
Coalition for the Homeless, Louisville	
Homeless and Housing Coalition of Kentucky	
Kentucky Affordable Housing Coalition	
Louisville Urban League	
Metropolitan Housing Coalition	
Metro United Way	
University of Louisville, Department of Urban and Public Affairs	

Goals of the health impact assessment, defined by stakeholders, include the following:

## Goals



## The proposed Kentucky Affordable Housing Tax Credit Program:



The proposed state LIHTC would equal the current federal LIHTC administered in Kentucky (\$12.5 million in credits annually for five years), essentially doubling the size of the program. The state LIHTC would function in a similar manner to the federal program. Developers apply for credits through the Kentucky Housing Corporation, and then can either hold the credit to deduct from their own tax liability or sell the credit in exchange for liquid capital to cover costs of construction or rehabilitation. By lowering the cost of overhead, the projects are intended to become a solvent investment for developers and at the same time, increase the amount of affordable housing for residents.

The key components of the state LIHTC would mirror the design of the federal LIHTC.<sup>31</sup> This includes how to determine what is considered affordable, stipulating how long investors can receive the credits, and how long units must remain affordable, how landlords and/or property owners must verify their information and the affordability of units, and which additional federal housing programs can be used in conjunction with the LIHTC. Allocation plans and community engagement are designed and implemented at the state and local level.



The Kentucky program, like the federal LIHTC program, has several stipulations around affordability. One of the requirements for investors or developers to receive the credit is to base unit pricing on the area median income (AMI) for which the development is located. This AMI, developed at the census tract level, can vary widely across the state, and is currently set to earning up to 60%.<sup>32</sup> As AMI can fluctuate from year to year, developers must monitor and maintain affordability. Landlords or property owners must also accept other federally funded programs and vouchers from programs like Section 8.<sup>33</sup> Beyond the requirement to set the units at an affordable price after development, there is also a requirement for those units to remain affordable for the 30 years.<sup>34</sup> By doubling the amount of available housing tax credits, Kentucky would see expanded availability of housing for families earning up to 60% AMI.

## Who is impacted by the bill?

### Those who are explicitly named in the bill as eligible for LIHTC housing include:

- Individuals and families earning up to 60% AMI (millennials age 25-40 make up a significant portion of the working population)
- Seniors
- Those aging out of foster care
- Veterans
- Those with Substance Use Disorder (SUD)

### While the proposed program targets a range of low-income residents, the bill will also have a larger community impact, including the following:

- Developers and Investors- those buying and using the tax credits
- Construction companies and their employees
- Local community businesses
- Residents in the neighborhood where housing is being built
- Business owners who need workers
- Local government
- State government





## Kentucky residents in need of housing

The National Low-Income Housing Coalition (NLIHC) estimates that in Kentucky there is a significant shortfall in the number of affordable units available for low-income (50-60% AMI) households. For every 100 families earning up to 60% AMI seeking affordable housing, there are only 81 housing units available.<sup>18,19</sup> One in five families at this income can't find an affordable place to live.

Along with those earning up to 60% AMI, the housing tax credit would also provide housing options for seniors, those aging out of foster care, veterans, and those recovering from SUD.



According to 2019 American Community Survey (ACS) 5-year estimates, there are 710,138 residents who are 65 years of age or older in Kentucky.<sup>17</sup> The median household income for this population is \$38,067. Notably, this is only slightly above the 60% AMI for Kentucky (\$30,353.40). According to 2019 ACS 5-yr estimates accessed through public use microdata samples (PUMS), 33.7% of Kentucky residents who are 65 years of age or older live in households that are at 60% AMI or lower.<sup>17</sup>

Youth exiting the foster care system have a strong need for sustainable affordable housing. The number of youths aging out of Kentucky's foster care system varies from year to year. However, according to the US Department of Health and Human Services, 706 youth exited to emancipation in Kentucky during 2019 (the latest available data).<sup>35</sup> Additional data from the U.S. Department of Health and Human Services, Children's Bureau indicated that between 2016-2018, 822 youth were receiving support for independent living.<sup>36</sup>

According to the Housing Assistance Council,<sup>37</sup> approximately 35,000 Kentucky veterans are living in a home with one or more major problems. Challenges include issues of quality, crowding, and cost. Among Kentucky veterans, housing affordability remains the greatest challenge with 19.5% of Kentucky veterans paying more than 30% of their income on housing.

The Substance Abuse and Mental Services Administration within the US Department of Health and Human Services estimates that there were 280,000 Kentuckians over the age of 12 with substance use disorder in 2018-2019. While not every individual will need housing, a stable living situation is critical for individuals in this population to recover.<sup>38</sup>



## Potential health outcomes related to housing access

The introduction of a new policy can create patterns of change in health (Figure 1). With the implementation of an affordable housing tax credit, Kentucky would see an increase in the number of units for individuals earning up to 60% AMI. The increase in affordable units from the state LIHTC would lead to an increased number of individuals living in affordable housing, which might change the neighborhood they live in, and increase the amount of discretionary money available to residents. With an increase in discretionary money due to reduced housing costs, a family may have more access to nutritious food, health care, or money for essential needs. This can lead to health outcomes such as changes in a person's ability to manage a chronic illness, changes in cardiovascular health because of access to more nutritious food, and a change in a person's immune system.<sup>1-3</sup>

Access to affordable housing can also lead to a change in mental health. When a person has good, quality, affordable housing, they may experience reductions in stress, anxiety, and depression.<sup>6-9</sup> A person in recovery with SUD can also benefit from having a safe, stable environment in which to recover.<sup>10</sup> Changes in housing can also reduce exposure to environmental contaminants such as lead, mold, rodents, and poor air quality. This change can improve respiratory health, reduce risk of lead poisoning, and can improve mental health.<sup>4,5</sup> Finally, a change in neighborhoods can lead to a change in transportation and employment. When an individual has access to improved employment and is spending less of their income on housing costs, the increase in discretionary money leads to an improved quality of life.

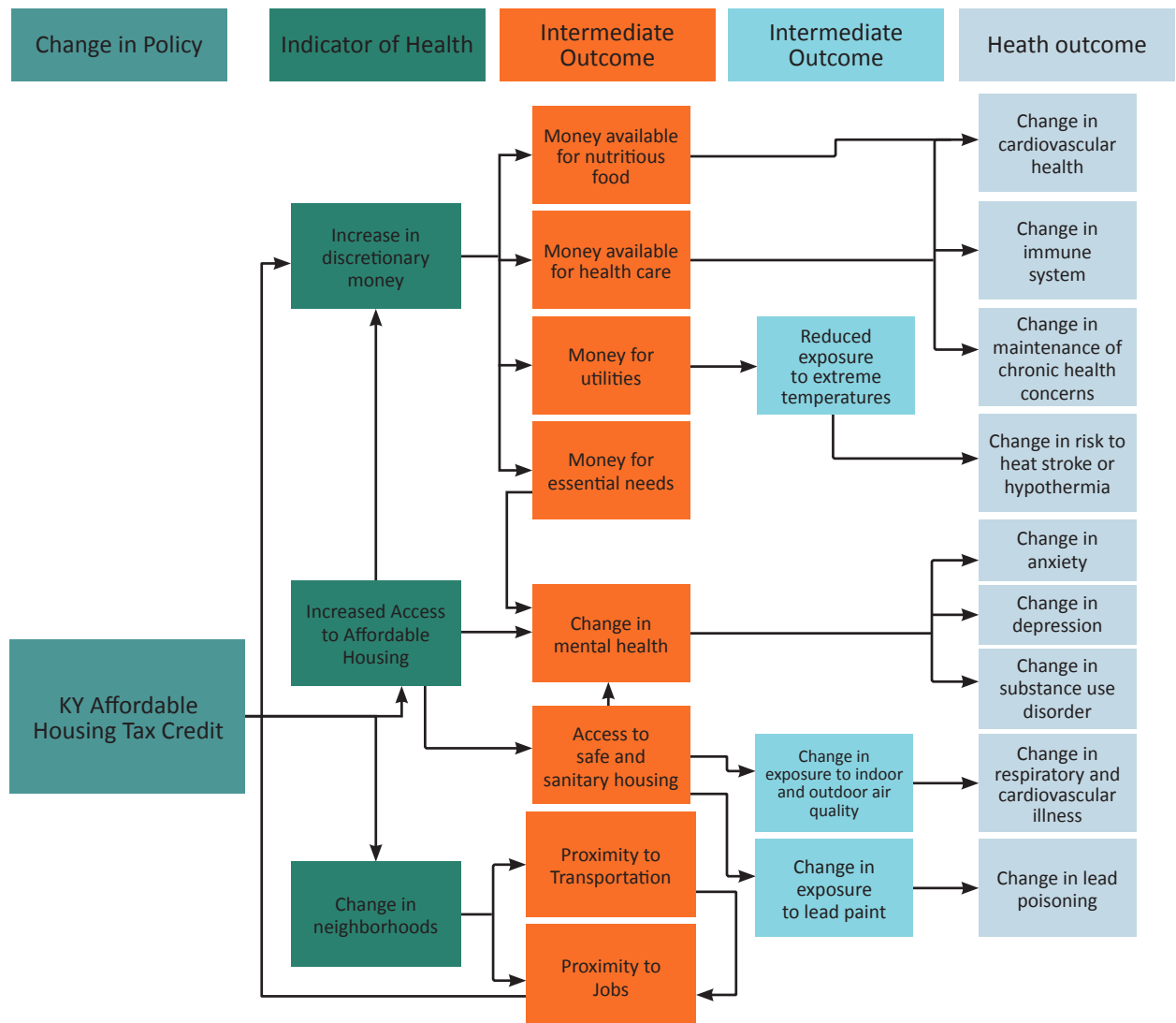


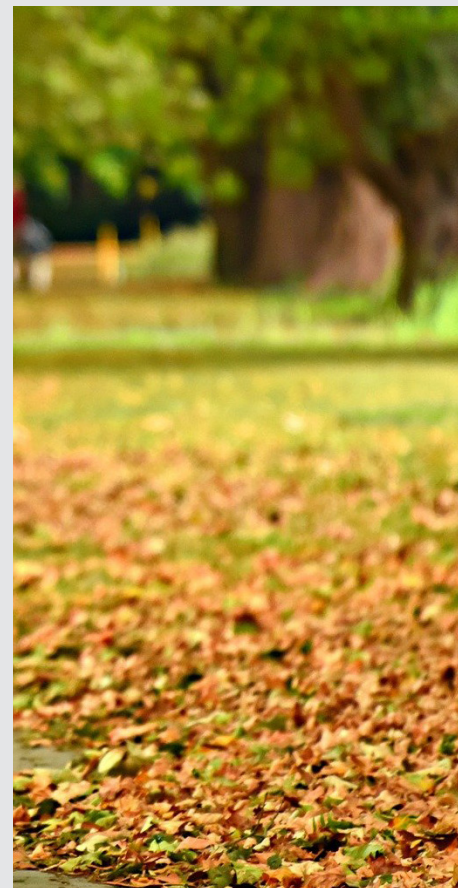
Figure 1: Kentucky Affordable Housing Tax Credit Health Outcomes Chart

## How does the Federal LIHTC Work?

The federal LIHTC has existed since 1987 and for quite some time has been the United States' largest subsidized housing construction and rehabilitation program. The existing research on LIHTC shows that it has fulfilled one of its central objectives: to stimulate private sector construction of safe and decent rental housing that is affordable for households with moderate incomes.<sup>39</sup> Direct construction and provision of public housing fell out of favor in the wake of highly publicized problems with high-rise public housing projects in the 1980s and 1990s. Urban historians and policy researchers have attributed the difficulties faced by high-rise projects to a complex set of factors, including architectural design blunders, inadequate planning for ongoing maintenance funding, and the financial pressures placed on developments from sudden and rapid White flight. Regardless of the realities, though, a simplistic public narrative emerged that placed the blame squarely on the shoulders of public housing itself, and on the low-income residents it serves. This narrative has driven American low-income housing policy away from direct provision of public housing and toward more indirect mechanisms.<sup>40</sup>

In addition to insufficient funding, public housing agencies are faced with a legal obstacle called the Faircloth Amendment. The Quality Housing and Work Responsibility Act of 1998 included a provision, the Faircloth Amendment, that explicitly prevented public housing authorities from constructing any new public housing units. Each was locked-in to whatever the number of units they managed as of 1999.<sup>41</sup> As federal housing increasingly turned toward a voucher-based approach, LIHTC emerged as one of the few sources of funding for new construction of affordable units. The population served by this new construction, though, was quite different. The 60% of AMI population served by LIHTC occupies a different place on the housing need continuum than the population served by public housing, where units can be affordable to households with extremely low incomes. New construction of units for that population is still quite limited.

For the 60% of AMI population, though, LIHTC has added to the supply of affordable units. A peer-reviewed 2019 study utilized HUD data to estimate that the federal LIHTC contributed to the production of 2.62 million rent-capped housing units from 1987 to 2015.<sup>39</sup> These units are often of a higher quality and enjoy better management by landlords than the comparable market-rate properties that LIHTC residents would be able to afford.<sup>42</sup> In other words, one of the primary benefits of the program is not necessarily affordability, since LIHTC developments are often located in neighborhoods with surplus housing supply at price-points that would be affordable for those who earn 60% of area median income (i.e., that qualify for LIHTC units).<sup>39,43</sup> Instead, the primary benefit for LIHTC households is that, for the same rent level, the housing they can afford is of a much better quality.





# Assessment

Kentucky's critical shortage of affordable housing units creates barriers to economic stability and can impact the wellbeing of both adults and children. Housing that is safe, stable, and free of health hazards such as mold or pests can positively impact wellbeing. The quality of the housing is also determined by where it is located. Access to good paying jobs, public transportation, and exposure to environmental factors such as air pollution and brownfields all play into the success of creating a healthy, quality, affordable place to live.

The assessment portion of the HIA addresses research questions developed in the scoping process. Methods of assessment included a review of who is impacted by Kentucky's affordable housing shortage, qualitative research which involved interviews with individuals who reside in affordable housing units, and a literature review of health impacts related to housing. On an individual level, the literature review addresses financial stability, environmental exposures in and around the home, and mental health outcomes related to housing. The literature review also looks at community wide impacts on housing prices as well as impacts on the local economy when a new facility is constructed.

Results of the assessment process are summarized in the reporting below.

## Kentucky's Affordable Rental Housing Shortage

A significant number of Kentuckians are faced with housing costs that place a strain on family budgets. Households are considered housing cost burdened if they spend 30% or more of their income on housing related costs. Households that spend more than 50% of income on housing are considered extremely housing cost burdened.<sup>44,45</sup> According to 2019 ACS 5-year estimates from the PUMS,<sup>17</sup> four out of 10 Kentucky renters live in households that are housing cost burdened, and an additional two out of 10 are severely housing cost burdened. Black residents, female residents, and seniors face higher rates of housing cost burden than their White, male, and middle-aged counterparts. Single-worker families also face higher rates of housing cost burden as opposed to families with two workers in the household (Figure 2).

"There is such a housing shortage in this town... even with the new housing that they built. Prices are very high around here."

- Male resident, Shelbyville, KY

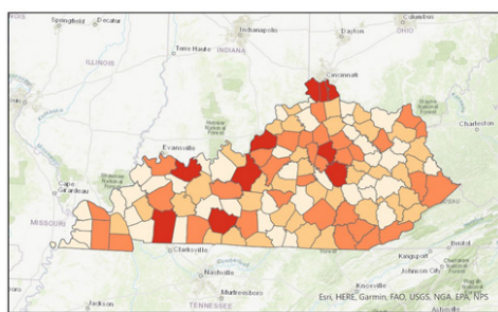
	Housing Cost Burdened count (percent)		Severely Housing Cost Burdened count (percent)	
<b>Kentucky Renters</b>	499,872	(41.6%)	245,178	(20.4%)
<b>Sex</b>				
Male	222,680	(38.7%)	105,456	(18.3%)
Female	277,192	(44.3%)	139,722	(22.3%)
<b>Race</b>				
White alone	367,825	(40.4%)	179,420	(19.7%)
Black or African American alone	89,823	(46.4%)	45,090	(23.3%)
All other races combined	42,224	(43.8%)	20,668	(21.4%)
<b>Ethnicity</b>				
Hispanic or Latinx	33,617	(39.4%)	15,970	(18.7%)
Not Hispanic or Latinx	466,255	(41.8%)	229,208	(20.5%)
<b>Age Group</b>				
Children (< than 18 year)	163,977	(47.7%)	85,797	(24.9%)
Young Adults (18 to 24)	69,023	(44.2%)	36,252	(23.2%)
Millennials (work force (25-40))	144,821	(35.3%)	52,355	(16.1%)
Other Adults (41 to 64)	110,178	(38.1%)	52,344	(18.1%)
Seniors (65+)	41,873	(48.5%)	18,430	(21.3%)
<b>Number of Workers in Family</b>				
No Workers	83,016	(15.4%)	54,673	(10.2%)
1 Worker	203,587	(17.6%)	96,874	(8.4%)
2 Workers	65,458	(4.6%)	22,006	(1.6%)
3 or more Workers	9,933	(2.2%)	2,666	(0.6%)

**Figure 2:**  
Demographics of  
Kentucky Renters

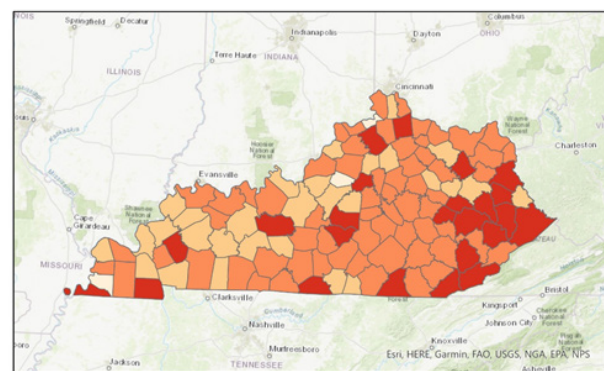
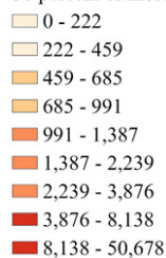


Focusing specifically on extremely low-income households (below 30% AMI) in Kentucky, eight out of 10 are cost-burdened and six in 10 are severely cost burdened (Figure 3). For those who live in low-income households (30 to 50% AMI), over six in 10 are cost burdened and almost two in 10 are severely cost burdened. There is a significant drop in the degree of cost burden faced by the next income category, low-income households, which is defined as households with 51%-80% AMI. Of these households, almost three in 10 are cost-burdened, but less than one in 10 are severely cost-burdened. This demonstrates that the greatest gap in affordable housing is for those at or below 30% AMI.<sup>18</sup>

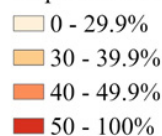
The Kentucky county with the highest percent of renters who are housing cost burdened is Wolfe County where 506 renter households (67%) are housing cost burdened (Figure 4). The county with the lowest percent of renter households who are housing cost burdened is Spencer County where 207 renter households (22.6%) are housing cost burdened. As seen in Figure 4, for 24 Kentucky counties, 50% or more of renter households are considered housing cost burdened. In 88 counties, 40% or more of renter households are considered housing cost burdened. In all but three Kentucky counties (118 counties), 30% or more of renter households are considered housing cost burdened (Calculation methodology: Appendix 1)



**Renter Households that are housing cost burdened  
30 percent or more of income on gross rent**



**Renter Households that are housing cost burdened  
30 percent or more of income on gross rent**



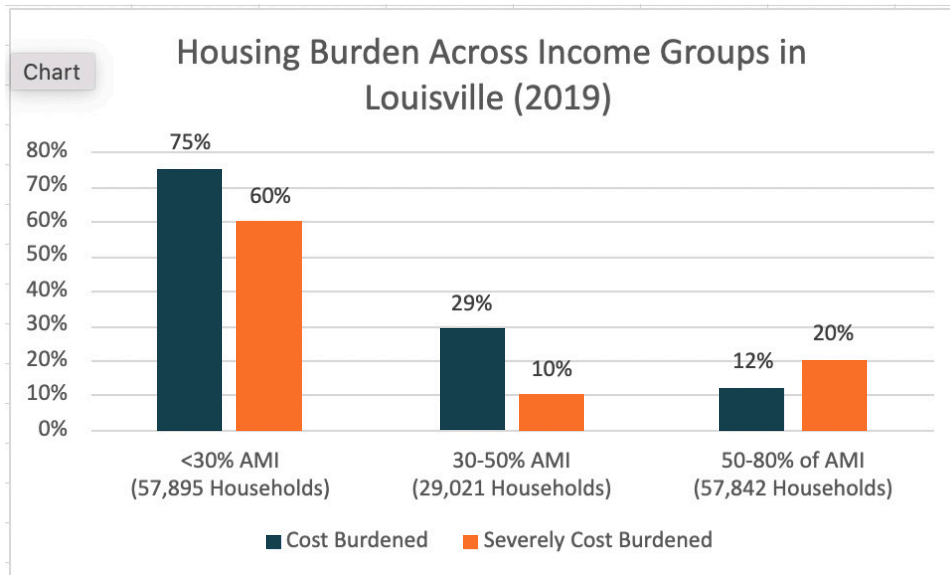
**Figure 3: Total Number of Cost-Burdened Renter Households by County**

**Figure 4: Percentages of Cost-Burdened Renter Households by County**



## Louisville/Jefferson County's Affordable Rental Housing Shortage

In 2019, a Housing Needs Assessment for Louisville was conducted by the Louisville Metro Government Office of Housing & Community Development and the Louisville Affordable Housing Trust Fund.<sup>35</sup> This analysis found a significant shortfall in available affordable housing for extremely low and very low-income residents of the city. The area median income for Louisville was \$71,500 in 2018. As seen in Figure 5, of the almost 60,000 households at 30% or less of AMI, three out of four were cost burdened, and six out of 10 are severely cost burdened (includes both rental and owner households). Of the almost 30,000 households between 30-50% of AMI, approximately a third were cost burdened, and at least one in 10 were severely cost-burdened. The pattern improves for the almost 60,000 households between 50-80% of AMI. Of these, just over one in 10 were cost burdened and two in 10, severely cost burdened.



**Figure 5:** Housing Burden Across Income in Louisville

## Impact of the COVID-19 pandemic on rent burden

The COVID-19 pandemic has exacerbated the housing affordability crisis. Many in the low- and middle-income service sectors have seen job losses, while skyrocketing construction costs have further impeded filtering and any increase in the overall housing stock. A comprehensive national 2021 study reports that 51% of renter households lost employment income due to the pandemic by March 2021.<sup>46</sup> In January 2021, one in five renters were behind on payments; by the end of March 2021, this had decreased to one in seven renters.<sup>46</sup>



## What current programs address housing affordability in Kentucky?

By size and scope, the largest inflow of housing support funds to the state is from the U.S. Department of Housing and Urban Development, which, in partnership with the 122 local public housing agencies (also called authorities), administer funding for public housing, Section 8 Housing Choice Vouchers, and a variety of other smaller programs. Looking only at the two largest HUD programs, in Kentucky in 2020, public housing agencies managed 21,632 units of public housing and administered 38,255 Housing Choice Vouchers, with an average federal subsidy per occupied unit of just over \$500 per month, or approximately \$320 million in federal subsidies annually.<sup>47</sup>

The US Department of Agriculture provides significant funding for housing support in rural areas of the state. They provide a variety of mortgage assistance and rent subsidy programs. While most of their programming is in the form of lowering loan rates for homebuyers and property owners, they also operate a rental subsidy program where rent subsidies are provided for low and very low-income tenants.<sup>49</sup>

The Kentucky Housing Corporation (KHC), the state's housing finance agency, manages a significant amount of housing support. Just as public housing agencies administer federal funds for public housing and vouchers, the Kentucky Housing Corporation administers federal funds for many of its programs. Some of the major programs administered by KHC include the Federal LIHTC, federal tax-exempt bond financing, HOME Investment Partnerships, the National and Kentucky Affordable Housing Trust Funds, several homeownership assistance programs, and homelessness-focused programs.<sup>50</sup> In addition, KHC acts on behalf of the state to administer the Housing Choice Vouchers. A selection of KHC's programs and their 2019 expenditures can be seen in Figure 6.

Program	2019 Expenditure (in millions)
Federal LIHTC	\$12.5
Tax Exempt Bonds (tax credits)	\$2.8
Tax Exempt Bonds (equity)	\$30.7
(KY) Affordable Housing Trust Funds	\$5.6
HOME	\$7.8
Down Payment Assistance	\$26

**Figure 6:** 2019 Kentucky Housing Corporation Program Expenditures

Local governments in Kentucky also administer programs related to housing support, though some of these are more directly related to housing than others. Many of these programs, like the others previously discussed, are local applications of federal funding streams, like the Community Development Block Grant and HOME Investment Partnerships. Louisville Metro Government also funds several programs out of its own revenue, such as the Louisville Affordable Housing Trust Fund, the Louisville CARES program, and the Community Land Trust.<sup>51</sup>

With much of the state's housing support going directly to rent support, rehabilitation, or homeownership assistance, the proposed LIHTC, would represent a significant increase in funding for new subsidized unit construction relative to existing levels.

It is also critical to consider the impact of a state LIHTC program in the context of projected losses of affordable units in the upcoming years. Since each affordable housing unit supported by LIHTC funding is only required to remain affordable over a span of 30 years, Kentucky is at risk of losing affordable housing stock if those that are set to expire are not replaced with new units or preserved as affordable housing for longer terms. According to the National Housing Preservation Database (NHPD), 7,653 federally assisted housing units with affordability restrictions are projected to expire in Kentucky within the next 10 years. Within the next five years, 61% of publicly assisted rental homes in Kentucky that are projected to expire are LIHTC supported homes. Creating a state funded LIHTC program can provide additional support to our affordable housing stock and help prevent a net loss of housing for years to come.<sup>52</sup>



# Qualitative Research Summary

Interviews with residents living in affordable housing revealed a range of themes regarding the impact of affordable housing on their lives. Residents sought healthy, accessible, affordable, and safe places to live. They described their experiences and challenges with the application process, management of units, space, access to jobs, and issues around walkability. Residents sought affordable housing to leave behind a moldy home, to move from homelessness to stability, and to find a unit that accommodated their physical needs.

Residents described their previous housing situations.

“

“Before, I’d also been living in a senior living community... However, [the current residence] was newer. Built to newer standards [for handicap accessibility]. I am handicapped. I’m a below-the-knee left side amputee. I needed something a little larger, a little better setup than the last place as it stood. I needed better quality parking and [better] outlay of the building. I was fortunate to get in there at the time ...There was very much a great shortage in town of even handicap accessible apartments.”

- Male resident, Shelbyville, KY

”

“

“I was going through a divorce, lost the house. Me and my kids were homeless. We had to stay with my cousin in a one bedroom for six months, almost a year, before we found this place. And it was really hard because, if you don’t have credit or a job or all of those things, it’s hard to get into a place.”

- Female resident, Louisville, KY

”

“

“...In my previous home, first, I had no issue at all. Then, slowly, the house started deteriorating and had rodents, insects, mold... It is numerous the things that I can actually name about that house. I feel as if that house just needs to be totally demolished, because it’s not safe for no other family to move in there.”

- Female resident, Covington, KY

”

Access to affordable housing units had a positive impact on residents’ lives. Residents felt their homes were comfortable, healthy, safe places to live.

“

“My favorite part is that it’s local... It is closer to my children’s school, grocery stores, entertainment. Yes, those are the main things. That’s the best part about it.”

- Female resident, Covington, KY

”

“

“The apartments are new. They haven’t been here... I don’t know how long they’ve actually been here, but the neighborhood is nice. I like it.”

- Female resident, Louisville, KY

”

“

“This was a new facility designed from the ground up to be a senior living community, wider, open spaces, greens, commons, and so forth. So the design was with people of my age bracket, 55 and older in mind. Closer to shopping and everything else. And a quiet community where it was laid out with everything in mind. It was income based, which helps me because I’m on social security disability.”

- Male resident, Shelbyville, KY

”

All the residents reported feeling safe in their neighborhoods. One resident reported a community feeling.

“When I drive my van, everybody just waves at each other... I mean, it's just a nice little lovely community.”  
- Male resident, Shelbyville, KY.

“I like the fact that I can actually jog in the neighborhood. That's the best part for me because I do. It's quiet for the most part.”  
- Female resident, Louisville KY

All interviewees shared that finding a new place to live was difficult, and the need for more affordable housing units was apparent. Waiting lists for housing were long, and the application process was complex.

“I had made application after application... Shelbyville housing authority [said] it might be six months up to 18 months... And at that time I didn't have my prosthetics. So I'm hopping around from my van on my walker, going into these places. [At one location], they had a handicap sign for you to park, but when you tried to get in the door, when you're trying to jump a wheelchair up a six-inch incline or a step, it's like, oh, okay, how are you supposed to do that?”  
“I think I probably put out \$250 just in credit checks, \$50 here, \$40 there, \$55 here and so forth like that. But most were telling me, well, we'll just put you on the list. We'll just put you on the list. We'll just put you on the list.”  
- Male resident, Shelbyville, KY

“... it was really hard. I cannot deny it. It was hard. That's why I was stuck in there for so long. It took over a year to find new housing.”  
- Female resident, Covington, KY

The design of housing units had a major impact on the comfort of residents. Residents described experiences of living in an affordable housing unit.

“I like the apartment. It's brand new. That's the thing that I like most about it. Like I said, I just don't like [that] it's getting crowded; the parking [is limited].  
My house was safe. I could always park in front of my house. But the main thing that I like about here is that I don't have to cut grass and I don't have to worry about fixing anything... And so I'm glad that I don't have to do those things anymore and I can focus on other things.”  
- Female resident, Louisville, KY





One resident reported improved health after moving, having fewer seizures, and no longer having respiratory issues. The move, however, did not reduce her stress.

“It’s due to the fact that there’s multiple families living here...the children and the residents, they will dirty up the hallways. The parking lot will be constantly dirty. As for certain times and hours, their children run back and forth and are loud, thumping above me and everything.”

- Female resident, Covington, KY.

The locations of affordable housing were mostly positive as residents were close to entertainment, grocery stores, and schools. Walkability was also a positive improvement with their new locations. Quality job availability, however, was lacking in these areas. One resident reported,

“The only jobs available in my neighborhood are restaurant and hotel jobs. [We need jobs in] healthcare, warehouse, high-end restaurants, possibility of working in daycares.”

- Female resident, Covington, KY

Overall, the interviews indicated that affordable housing had positive impacts on residents. Residents were grateful to have an environment that was clean, friendly, safe, and met the needs of their families. Challenges included a short supply of affordable housing and a lengthy application process. The design of a unit appeared to have a significant impact on the wellbeing of residents. While residents in multifamily housing felt crowded and that noise was an issue, the resident in the senior housing duplex felt he had sufficient space. Addressing design issues such as more soundproofed walls, more open space, and sufficient parking could improve comfort and quality of life in affordable housing construction.

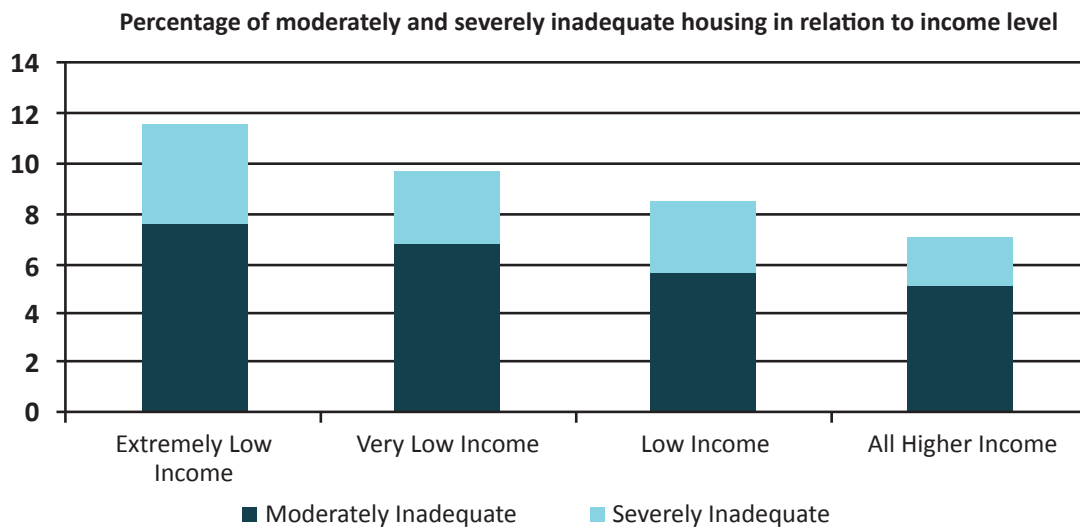
# Literature Review

## Impacts of economic stability on individuals and families

Many Kentuckians cannot afford adequate housing. Seventy percent of the commonwealth's extremely low-income families pay more than half of their total income towards rent.<sup>53</sup> Families facing financial instability often make hard financial choices that can lead to negative health outcomes. Prioritization of rent limits funds for healthy food, healthcare, and basic necessities.<sup>1</sup> Children facing housing instability with less access to healthy foods may experience lower engagement in school, poorer health, and emotional wellbeing.<sup>1-3</sup>

Limited budgets can lead to energy insecurity. Choosing between utilities or food, rent, and medicine can either lead to unhealthy temperatures in the home, or insufficient food and medication. During the pandemic, disconnections increased across many households regardless of income level.<sup>54</sup> Energy insecurity is seen more often in families that have children, have lower income, have a limited education, have a Black head of household, and are often renters.<sup>54</sup>

The pandemic has been difficult for low-income families and people of color. Poorer neighborhoods have seen higher rates of evictions as those who lost employment missed payments.<sup>55</sup> In 2021, almost twice the number of households with children were behind on paying their rent compared to households without children.<sup>56</sup> Often these extremely low-income families are Black and Latinx families, as well as families with older adults.<sup>57</sup> On average, these families are more likely to experience substandard housing than their White counterparts.<sup>58</sup> Figure 7 shows the share of occupied rental units in relation to income level. Those identified as extremely low income are more likely to occupy moderately to severely inadequate housing compared to those of higher income.



Notes: Extremely low / very low / low income is defined as up to 30% / 30-50% / 50-80% of area median income. Inadequate units lack complete bathrooms, running water, electricity, or have other deficiencies.  
Source: JCHS tabulations of HUD. 2013 American Housing Survey.

**Figure 7:** Percentage of moderately and severely inadequate housing in relation to income level

The Centers for Disease Control (CDC) lists economic stability as a key social determinant of health, meaning that there is a connection between the amount of financial resources available to a household and their overall health outcomes.<sup>59,60</sup> When households are financially secure and are not struggling to make housing payments, they have greater control and freedom in how they choose to spend, save, borrow, and plan for current and future investments in their health.<sup>1,61</sup> This financial security can look like increased funds for higher quality, nutrient dense food, and access to healthcare services. For example, those who have more discretionary and higher incomes typically purchase more fruits and vegetables that can often be more costly than less nutritious items, compared to those who have fewer financial resources.<sup>20</sup> In terms of healthcare services, low-income households are more likely to report issues with making health-related payments, struggle to afford prescriptions, and delay healthcare needs.<sup>62</sup> Increasing a family's discretionary income through affordable housing can improve their ability to invest in their health and improve their overall life outcomes.





## Environmental conditions inside the home and across the community

Safe, clean, quality housing is a key determinant of health. Environmental exposures, both indoor and outdoor, can lead to a range of poor health outcomes. Indoor environmental exposures include mold, lead paint or pipes, insects or rodents, unsafe wiring, and extreme hot or cold temperatures. Outside the home there is potential for exposure to high levels of traffic, high levels of noise, and exposure to brownfield sites or other industrial sources of pollution. Newly constructed affordable housing units must meet standard criteria to reduce environmental hazards. Increasing the number of healthy housing units would potentially help reduce the number of individuals living in unhealthy environments.

### Inside the Home:

While the overall quality of U.S. housing stock has steadily improved over the last 10 years, the inadequacies that do exist are three times more likely to be present in rental housing compared to owner-occupied housing.<sup>63</sup> Issues include overcrowding, exposed wiring, heating, and air issues lasting longer than six hours, presence of pests such as rats or roaches, toilet breakdowns, and shared plumbing facilities. Notably the American Housing Survey conducted by the US Census Bureau does not account for other health-related issues such as gaps in roofing or foundations, or the presence of mold. This suggests there is an underreporting of housing inadequacies by the Census.<sup>63</sup>

Individuals with poor housing quality are at greater risk of indoor environmental exposures.<sup>64</sup> Older homes in the United States are more likely to have moisture, mold, and sources of lead (such as paint or pipes) present, all of which can cause numerous negative health effects.<sup>4,5</sup> The presence of mold has been found to exacerbate respiratory health problems such as asthma, infections, and bronchitis.<sup>65</sup> Mold and moisture also contribute to more hospitalizations, insurance claims, and mortality.<sup>66</sup> Lower-income households are, on average, more likely to have problems with mold, which poses equity concerns.<sup>67</sup>

Exposure to lead via paint or lead pipes can cause developmental delays in children. Studies have shown that elevated blood lead levels are more common among children with lower family incomes, non-Hispanic Black children, children living in older housing, and children living in neighborhoods with shortages of jobs and affordable housing.<sup>68,69</sup>

“...In my previous home, first, I had no issue at all. Then, slowly, the house started deteriorating and had rodents, insects, mold... It is numerous the things that I can actually name about that house. I feel as if that house just needs to be totally demolished, because it's not safe for no other family to move in there.”

- Female resident, Covington, KY





Issues around quality and maintenance are complex. Resources for upgrades may be scarce, particularly in lower-income neighborhoods. Owners may have trouble finding a lender to get the necessary improvement funds or are unwilling to raise rents to generate enough revenue in fear of pricing out their tenants. Renters may also be hesitant to report inadequate conditions for concern they will be evicted from one of the few places they can afford.<sup>70</sup>

Those with lower incomes may also be more likely to experience extreme high and low temperatures. Extreme temperatures, especially heat, have a profound impact on health. Heat islands are urban areas which experience higher temperatures than surrounding areas and can have adverse health implications including respiratory difficulties, heat cramps, heat exhaustion, and heat stroke.<sup>71</sup> Excessive temperatures are also deadly, especially among the elderly.<sup>21,72</sup> Non-White and non-English speaking populations, including those living in affordable housing, experience higher in-home temperatures than others due to insufficient air conditioning or ventilation.<sup>73</sup> Lower-income populations are more likely to live in homes that are more difficult to heat and are more likely to struggle to pay their energy bills.<sup>74</sup> In Louisville, the urban heat island effect is most prominent in the West and South ends of town, which tend to be lower income, higher renter areas.<sup>75</sup>

Poor housing quality and design can affect an individual's overall health through noise disturbances. Loud and persistent noise disturbances can range in severity from general annoyance to long term health outcomes such as cardiovascular disease.<sup>76</sup> Noise can specifically affect individuals in their homes through disturbances of sleep. When these disturbances are consistent, they can negatively affect quality of sleep which can impair overall mood, reduce cognitive awareness and ability, and increase drowsiness during hours that individuals are awake.<sup>77</sup> Noise disturbances at night are also related to cardiovascular disease through long-term outcomes due to acute effects on the autonomic nervous and endocrine systems during repeated arousals while sleeping.<sup>78</sup> This research, considered comprehensively, demonstrates the importance of ensuring that housing is affordable *and* of sufficient quality to prevent negative health outcomes.



## Outside the Home:

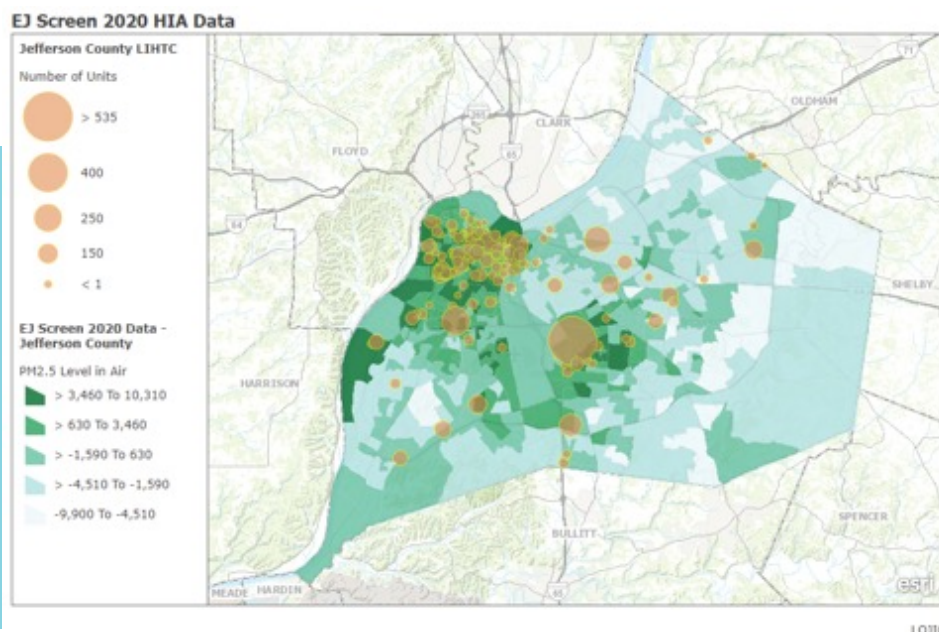
Where housing is located also has several implications for health. Current research demonstrates that low income and people of color are more likely to live near harmful environmental exposures. Exposure to traffic, brownfields, factories, and power plants all have associated health risks.<sup>21</sup> Traffic exposure increases asthma risks among children, especially near schools and homes.<sup>22</sup> Higher levels of noise can contribute to lack of sleep, elevated annoyance and stress levels, noise induced hearing impairment, and impaired cognitive performance.<sup>22</sup> High levels of traffic exposure have also been linked to higher coronary calcification,<sup>79</sup> which is linked to major adverse cardiovascular events.<sup>80</sup> Many studies have also shown that non-white, lower socioeconomic status individuals, are far more likely to be exposed to elevated levels of traffic.<sup>79,81</sup>

Typically, those in need of affordable housing are more likely to live near abandoned buildings, brownfields, or production facilities that produce air and water pollutants.<sup>21</sup> Defined by the EPA as “a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or containment,” brownfields can contain a wide range of contaminants including volatile organic compounds (VOC), petroleum hydrocarbons, lead, asbestos, PCBs, creosote, cadmium, chromium, and arsenic.<sup>82</sup> Brownfield exposures have been linked to lowered immune response,<sup>83</sup> heart disease, lung, and stomach cancer.<sup>84</sup> These dangerous sites are typically concentrated in marginalized communities due to disinvestment, neighborhood segregation, housing discrimination, and other facets of historic racism.<sup>85</sup> The research also shows that individuals and families of color, as well as those with lower incomes, are disproportionately impacted by housing related environmental health concerns.<sup>86</sup>

## Mapping Environmental Data:

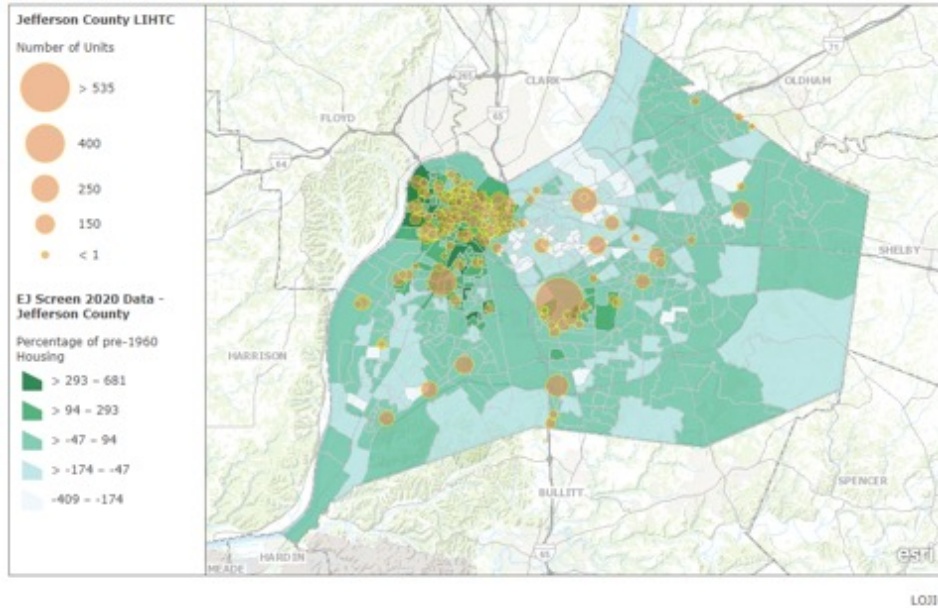
Those in need of affordable housing are likely to face barriers to experiencing a healthy natural and built environment. Pollution and exposure to high levels of traffic volume pose significant health implications. Below are a few maps that describe the environmental barriers faced by those in need of affordable housing throughout Kentucky. As a note, the darker the shade of green, the more concentrated the environmental hazard (lighter colors mean less of an environmental impact). The larger the orange circle, the denser the affordable housing units are in that area.

In Jefferson County most of the environmental pollutants and hazards are focused in historically Black areas, mainly the West End and the neighborhood of Newburg. The historic and ongoing impacts of segregation, housing discrimination, and community disinvestment are evident in the following maps. Figures 8 and 9 map where LIHTC projects have been built in Jefferson County since the program’s inception<sup>23</sup> and compare it with data from the Environmental Protection Agency’s (EPA) EJ Screen, an environmental justice tool to map potential risks and hazards across the nation. Most projects are concentrated in the West End of Louisville, where residents are more exposed to environmental hazards.



**Figure 8:** Map of the number of LIHTC units constructed across Jefferson County relative to PM2.5 in the air

#### EJ Screen 2020 HIA Data



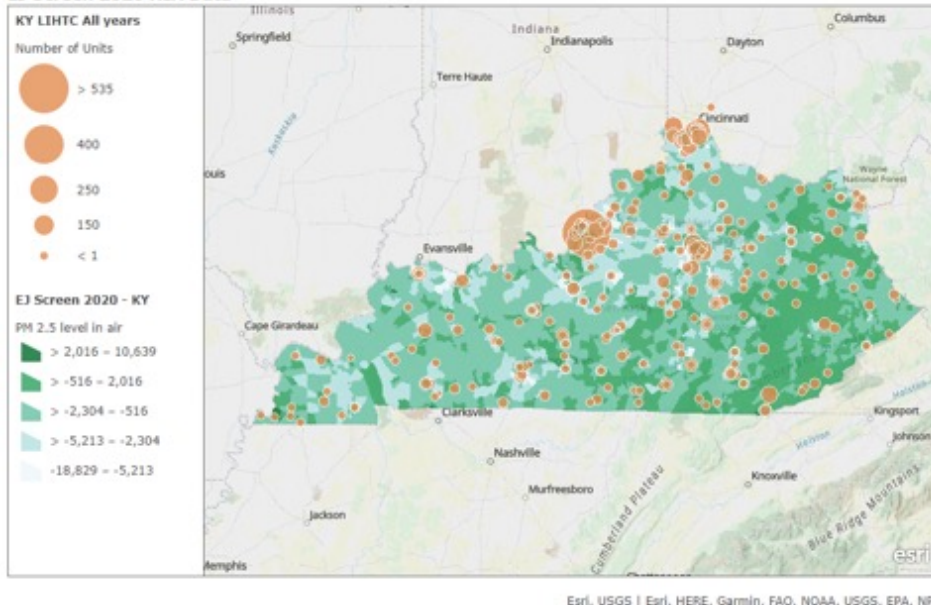
**Figure 9:** Map of the number of LIHTC units constructed across Jefferson County relative to the placement of pre-1960 housing

State-wide, levels of particulate matter (PM 2.5) in the air are noticeably concentrated in urban areas such as Louisville and Lexington, as well as the eastern portion of the state. PM 2.5 is a mixture of solid and liquid particles, mainly dirt, dust, and soot, which can cause adverse health effects. The second map highlights the percentage of housing built before 1960, which indicates the potential for lead in the home, via lead paint or lead pipes. Figures 10, and 11 map the state environmental hazards. Generally, the entire state has relatively old housing stock. However, the trend is most noticeable in eastern portions of the state.

These trends can be seen in other counties as well. Figures 12 through 16 highlight three Eastern Kentucky counties: Bell, Knott, and Wolfe. The most northern and most southern portions of Bell County have the highest level of environmental hazards. Knott County's eastern portion experiences higher levels of environmental hazards, while the southern portion of Wolfe County features the highest level of environmental hazards. These areas also contain a high number of LIHTC housing. (Mapping methodology, Appendix 3)

Ensuring that environmental exposures are considered in the placement of new affordable housing units is critical. Shifting historic trends may help improve the long-term health outcomes of residents utilizing affordable housing.

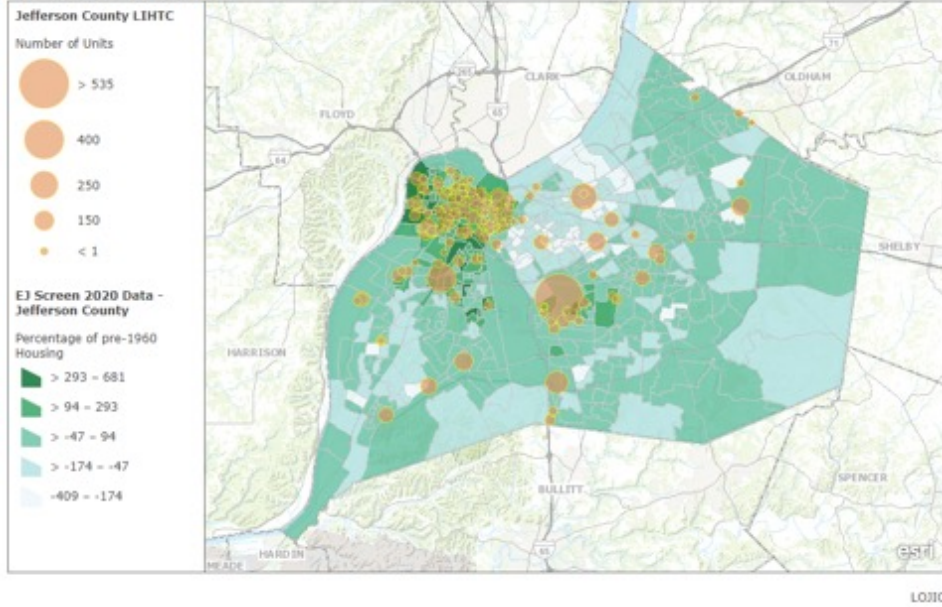
#### EJ Screen 2020 HIA Data



**Figure 10:** Number of LIHTC housing units relative to PM2.5 levels across Kentucky

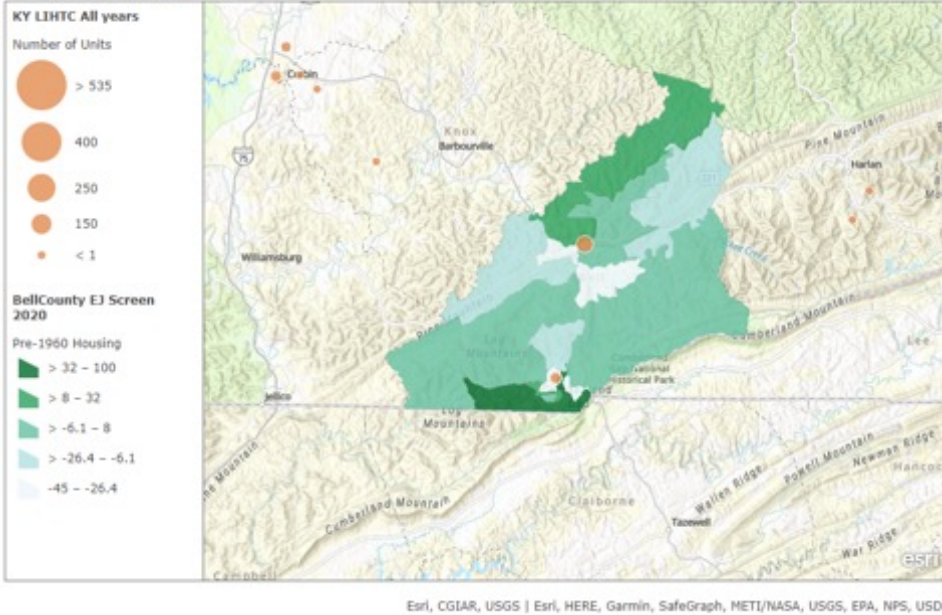


# EJ Screen 2020 HIA Data



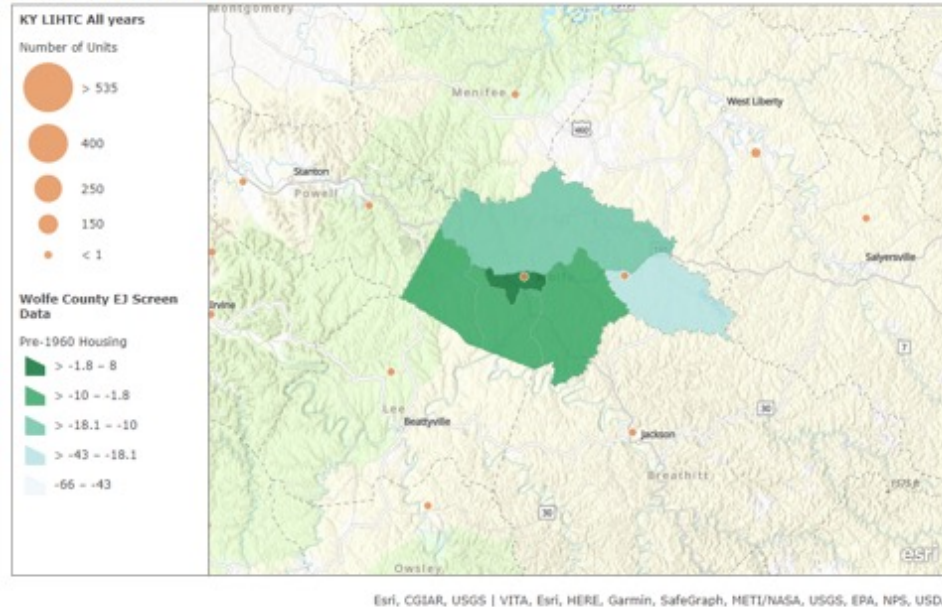
**Figure 11:** Number of LIHTC units relative to the number of pre-1960 housing units across Kentucky

# EJ Screen 2020 HIA Data



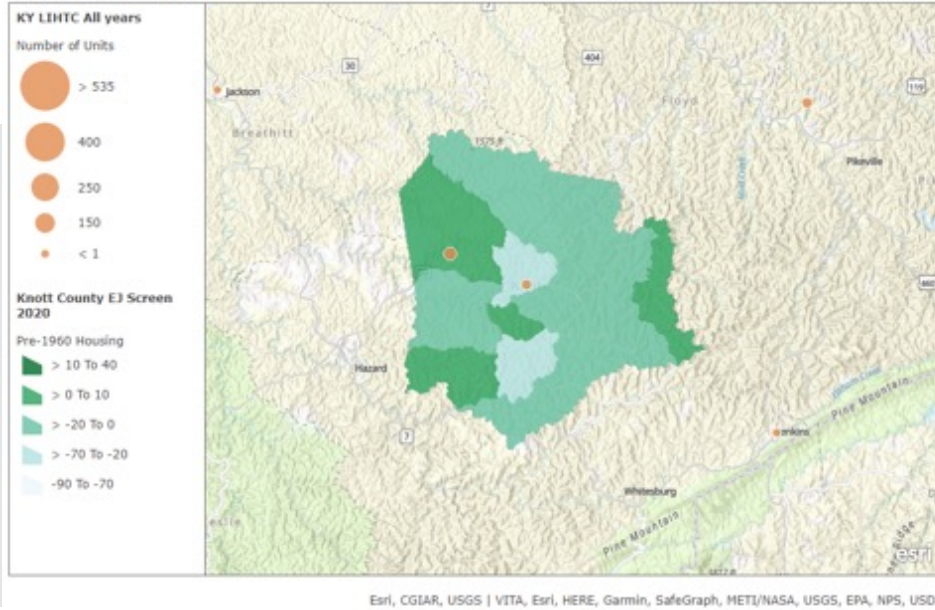
**Figure 12:** Number of affordable housing units in Bell County, Kentucky relative to the placement of Pre-1960 Housing

# EJ Screen 2020 HIA Data



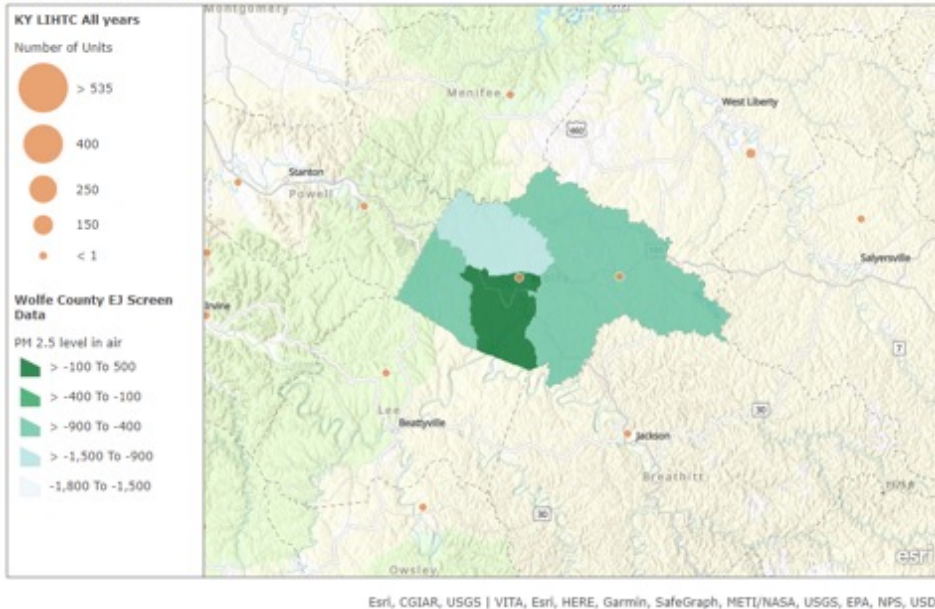
**Figure 13:** Number of affordable housing units in Wolfe County, Kentucky relative to the placement of Pre-1960 Housing

# EJ Screen 2020 HIA Data



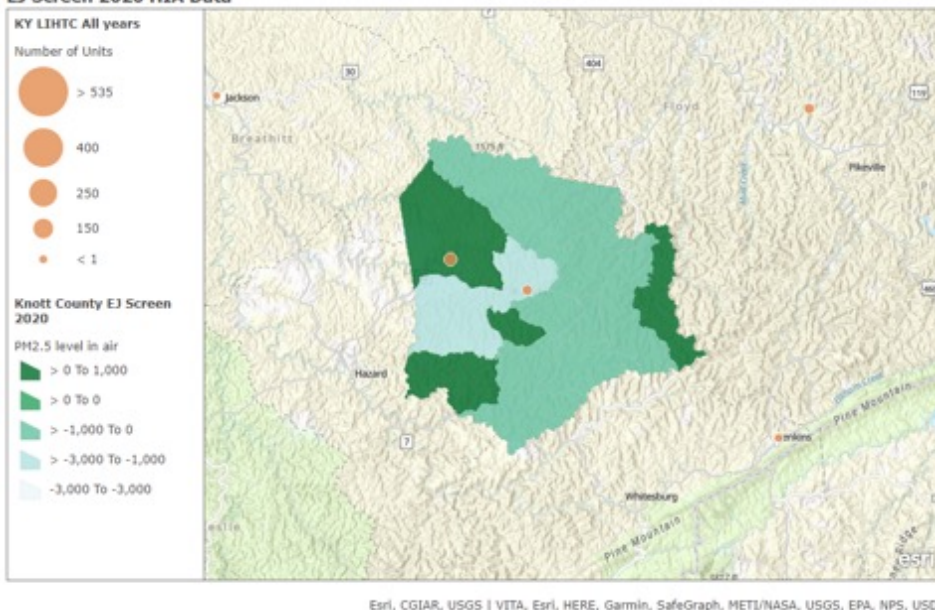
**Figure 14:** Number of affordable housing units in Knott County, Kentucky relative to the placement of Pre-1960 Housing

# EJ Screen 2020 HIA Data



**Figure 15:** Number of Affordable Housing units in Wolfe County, Kentucky relative to pm2.5 levels in the air

# EJ Screen 2020 HIA Data



**Figure 16:** Number of Affordable Housing units in Knott County, Kentucky relative to pm2.5 levels in the air



## Housing and Mental Health Impacts

Housing is fundamental to quality of life. When housing becomes unstable due to expenses, physical conditions, or security, it can severely impact mental health. These negative mental health outcomes can be experienced through many pathways, including housing instability, affordability of current housing arrangements, physical conditions of a dwelling, and neighborhood characteristics of a housing's location.

### Homelessness

When a community experiences a lack of housing affordability options, individuals within that community are more at risk of losing their home. Those who are already homeless have less opportunity to exit homelessness through affordable options. While LIHTC may not be a direct and immediate solution to homelessness, it can increase the volume of affordable housing stock in an area, expanding options for those with higher incomes, and positively affect a continuum of affordability options in a community that may lack them.

“ Me and my kids were homeless. Had to stay with my cousin in a one bedroom for six months, almost a year, before we found this place. And it was really hard because, if you don't have credit or job or all of those things, it's hard to get into a place.

- Female resident, Louisville, KY ”

Studies show that the strongest links between poor mental health and housing disadvantage has been found for individuals experiencing chronic homelessness. For children experiencing homelessness, studies find that they are more vulnerable to poor mental health, academic and developmental delays, poor cognitive health outcomes, and depression than children who live in stable housing conditions.<sup>23</sup> Research studying homeless adults have also found high levels of morbidity in physical and mental health, including increased hospitalization rates and chronic illness.<sup>87</sup> Much of these long-term mental health outcomes are realized through trauma individuals experience in the streets and in shelters that exacerbate the psychological distress of facing housing insecurity.<sup>88</sup>



## Chronic Instability

Although there is a strong link between highly adverse mental health outcomes for those who experience chronic homelessness, there is also substantial evidence in the literature that connects poor mental health to chronic housing instability in general. Residential stability has been defined as “a residents’ capacity to willingly remain in their homes free from harassment or dispossession.”<sup>67</sup> In this sense, the opposite is true for those facing instability. Chronic housing instability may include patterns of frequent moving due to affordability and safety issues, couch surfing, or falling behind on rent or mortgages that put one at risk of eviction or foreclosure. There are many instances in the literature linking housing instability to increased stress levels and depression and demonstrates that individuals who are experiencing chronic housing instability report twice as high rates of depression and anxiety and often delay visits to the doctor due to costs compared those who are living in stable housing conditions.<sup>6,7,88,90</sup>



Housing insecurity also affects families differently depending on income level. A study analyzing the mental health effects of being housing cost-burdened (paying more than 30% of annual income on housing expenses), found that there was a decrease in mental health scores for those who were low-to-moderate income while those in high income households did not have a significant association with lower mental health scores.<sup>91</sup> A possible explanation of this is the link between mental health and the experience of being burdened by housing costs. Studies show that low-to-moderate income households who meet the threshold of being housing cost-burdened experience a negative impact on their mental health. In contrast, higher income households spending the same proportion of their income on housing do not feel the economic strain on their essential needs as much, resulting in a much lower impact on mental health.

While there is a general trend linking poor mental health outcomes to housing instability, the effects vary for specific populations. A systematic review of residential mobility during childhood found that there is an association between the frequency of moving to a new home with elevated levels of behavioral and emotional issues, as well as drug use, adolescent depression, and reduction in

health care visits throughout the course of their life.<sup>92</sup> A longitudinal survey analyzing the health and wellness outcomes of new parents and their children found that mothers who experienced eviction experienced greater stress and struggled to fulfill parenting responsibilities, were more likely to suffer from depression, and were more likely to report poor health for themselves and their children.<sup>93</sup>

## Poor housing quality

An individual with substandard housing conditions may also experience poor mental health outcomes. When a home is not properly insulated or an individual cannot afford to adequately heat and cool their home, they may experience thermal discomfort and suffer from higher levels of stress, depression, and anxiety.<sup>8,9</sup> Poor housing conditions that affect an individual’s physical health can increase the likelihood of adverse psychological effects due to increased stress on the body from active illnesses or worries of future illness.



## Stability

Housing instability impacts individual health by increasing risk of poor mental health outcomes and access to health services. Conversely, studies measuring health outcomes for those who live in stable living conditions tell a different story. Studies have specifically analyzed mental health outcomes for individuals who have housing stability through long-term tenure in a dwelling. In these studies researchers find a connection between longer tenures in a dwelling and reduced levels of depression among adult seniors and less behavioral concerns among teenage youth such as aggression and anxiety.<sup>94,95</sup> Another study measuring the effects of long-term housing subsidies, which reduces risk of chronic housing instability by providing vouchers to pay for housing costs, found that the subsidies reduced psychological distress in adults and reduced behavioral issues, school absenteeism, and difficulties with sleeping for children.<sup>96</sup>

In addition to housing stability reducing cases of mental illness and distress, living in safe and stable housing has also been linked to a healthier relationship to the healthcare system and receiving mental health assistance. A recent study analyzed the effects that receiving housing assistance had for adults who qualified for US Department of Housing and Urban Development (HUD) and found that current assistance recipients were more likely to have health insurance and less likely to have medical needs that were unmet compared to future recipients who applied for assistance but did not yet receive any.<sup>97</sup> In a similar assessment, a systematic review of formerly homeless adults experienced a reduction in the number of days hospitalized after receiving positive housing interventions that strengthened their housing stability.<sup>98</sup> The combined highlighted studies show that housing stability can expand an individual's financial capacity to receive the healthcare they need to manage their mental health and general medical conditions.

## Child Well-Being and Housing

While there is a large body of research that shows a connection between poor health and housing instability for the population in general, it is critical to also consider these specific effects on children's well-being and development. Researchers have found a relationship between children's cognitive development and housing affordability, with results that show that when families experience a housing cost burden close to 30% of their household income, they are able to invest more expenditures into cognitive enrichment for their child.<sup>99</sup> Children are also at higher risk for negative physical effects of inadequate housing; health outcomes related to inadequate housing such as asthma and lead exposure are significant contributors to childhood morbidities, especially in low-income families or households of color.<sup>100</sup> In addition to cognitive and physical affects, there is evidence that children experiencing housing instability may suffer from negative health outcomes into adolescence. A longitudinal study as recent as 2021 found that children experiencing housing insecurity at age 5 were more likely to experience depression at age 15 and were more likely to self-report behavior that exhibited adolescence delinquency.<sup>24</sup>

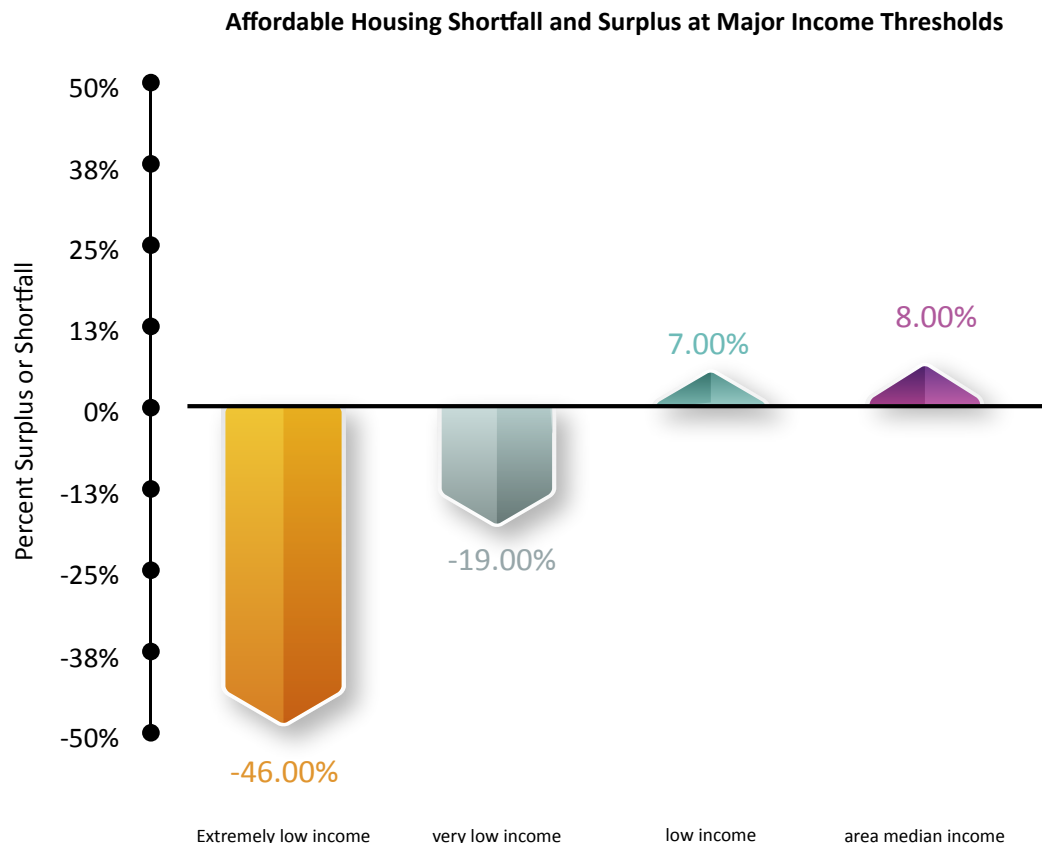


## Assessing the Affordable Rental Housing Shortage

As discussed previously, housing needs are significant across the entire income spectrum. The National Low-Income Housing Coalition (NLIHC) estimates that in Kentucky there is a significant shortfall in the number of affordable units available for extremely low-income (30% AMI) and very low-income (31%-50% AMI) households.<sup>18,19</sup> As demonstrated in Figure 17, For every 100 *extremely* low-income households, there are only 54 affordable units available, a shortage that is estimated at 77,701 total units in 2021. For *very* low-income households there are only 81 units available out of every 100 needed. Approximately 11% (192,000) of Kentucky's households fall between 30% and 50% of the state's median income. At 80% AMI, there are more units available than households (107 for every 100 households), and at the area median wage, there are also more units available than households (108 for every 100).

101-103

(Methodology of calculation: Appendix 2)



**Figure 17:**  
*Affordable Housing Shortfalls and Surpluses at Major Income Thresholds*

A 2020 report from the Joint Center for Housing Studies of Harvard University<sup>104</sup> suggests that, in recent decades, the United States has seen a steady rise in demand for rental housing, outpacing the growth in supply. Assessments of the causes of these trends vary, but some of the leading explanations identified by researchers include a decline in homeownership rates, working class and middle-class wage stagnation, and the prevalence of exclusive single-family home zoning in metropolitan areas, which tends to simultaneously price-out households from the homeownership market while also reducing the supply of new rental housing.<sup>105</sup> Some of the factors that have hindered homeownership are increased strictures on mortgage access after the 2008 housing market collapse, and a dramatic increase in average home prices and the cost of new home construction.<sup>104</sup> Another factor is that, as home values soar, there is more incentive to sell a house rather than rent it, further decreasing the number of units in the rental housing stock.<sup>104</sup> These and other trends have simultaneously increased the proportion of the population that rents, while limiting the ability of the private sector to meet that increased demand. As a result, rents have increased, and renter households have found it more and more difficult to find quality housing that meets the standard definition of affordability and cost burden (having housing make up less than one third of household income).<sup>104</sup> In other words, renters are paying more and getting less. These challenges become even more acute at the lower end of the income scale, where housing cost burdens have reached a level that many have labeled a crisis. Meanwhile, public assistance, in the form of housing subsidies of various kinds for lower income households, has remained relatively stagnant.



One of the key dynamics of the current affordable housing crisis is that as more middle and even upper income households have remained in the rental market with limited growth in the housing stock, a process that housing economists call “filtering” has been impeded. Filtering refers to the phenomenon that, as households grow in size or income, they often choose to look for housing that is bigger and/or higher quality, including for some, moving into brand new homes or apartments. It also encompasses the idea that, as housing ages, it tends to decline in price relative to prevailing market rates, making it more affordable for more households over time.<sup>106-108</sup> With filtering, as new housing units are added to the stock, higher-income households move into those new units, freeing up their previous dwelling for a different household, for whom that unit represents a step-up in quality. Filtering is relevant to the current affordability crisis because, as new home construction and homeownership rates slow and more households with higher incomes remain in the rental market, the filtering process stagnates. Demand for rental housing goes up, and increased pressures of housing cost cascade down the income ladder, with middle-income renters now more likely to be cost burdened and the lowest-income households facing the greatest challenges.

## Impacts of Housing Tax Credits on the Local Community

“It was tough, and we saved up our money to get in here. Thank God we were able to do that.

- Female resident, Louisville, KY

Affordable, quality housing is key for individual and community health. Changes to neighborhood housing markets, however, can impact existing residents. Research suggests that the introduction of Low-Income Housing Tax Credits (LIHTC) can affect local housing prices, though the impact varies in different markets.

Research by the University of Minnesota Center for Urban and Regional Affairs found that rents on existing

housing within 300 meters of new construction projects increased an average of 6.6% in lower-tier submarkets but decreased by 3.2% in higher tier sub-markets.<sup>109</sup> A working paper by the W.E. Upjohn Institute, observed similar patterns with rents decreasing by 5-7% within 150 meters of new construction of large apartment buildings in low-income census tracts.<sup>110</sup> The authors conclude that new construction follows rather than causes neighborhood change, as developers seek to maximize profit by investing where growth is already happening. Even if rent prices are increasing overall, they would have increased more without the downward price pressure provided by the new construction.





Different dynamics are recorded in a paper that observed a period of increased construction in Brooklyn, New York from 2006-2008, when developers rushed to initiate construction prior to a planned property tax increase. The study found that a building's total rent (the sum of all tenants' rent) saw an average increase of 2.3% per new unit constructed within 150 meters, along with finding an increase in amenities and a greater number of higher-income White residents.<sup>111</sup> Together, these findings would lend support to the idea that in areas with a competitive market and lots of new construction (for example, Brooklyn), additional construction may lead to local rent increases by attracting more affluent residents to the area.



The literature appears to offer contradictory conclusions on the impact of new rental construction on surrounding rents, but it is possible to glean some patterns in the research. First, it is methodologically difficult to isolate the causation from the correlation when it comes to the relationship between new construction and surrounding rents; even if they appear to be related, it is not necessarily the case that new housing construction *causes* the change in rents. It may instead be that neighborhood change induces construction, as the UpJohn Institute paper suggests, or it may be that they are simultaneously influenced by outside factors. Second, whether the impacts are positive or negative, they appear to be fairly small; estimates range from a 7% decrease to a 6.6% increase. It is not clear that changes of this size would translate to material changes in residents' health and well-being, but even small changes are likely to matter more for economically vulnerable households. This question of rent savings and affordability is important to consider in the context of health equity as people who are better able to afford their shelter are better able to make the investments that keep themselves and their families healthy.





The different market dynamics of new construction are also important to consider in the context of affordable tax credits. There is not current consensus on best practice of where to focus investment of affordable housing developments. Some research points to benefits for low-income individuals who are able to move into high-income neighborhoods, which might increase overall access to improved quality of resources.<sup>112</sup> However, these neighborhoods may not have strong infrastructure like public transit that families rely on, or resources may be more cost prohibitive.<sup>113</sup> Additionally, higher costs of property and potential pushback from neighbors who want to prevent affordable housing from being built can prevent these projects from moving forward in higher income areas.<sup>114</sup>

A preference for locating affordable housing in low-income neighborhoods might consider the ability for individuals to maintain social connections in existing neighborhoods, or that additional development could increase further investment into a historically under-invested neighborhood.<sup>115,116</sup> However, this could impact displacement of existing residents who are not able to receive the benefits of the new development.

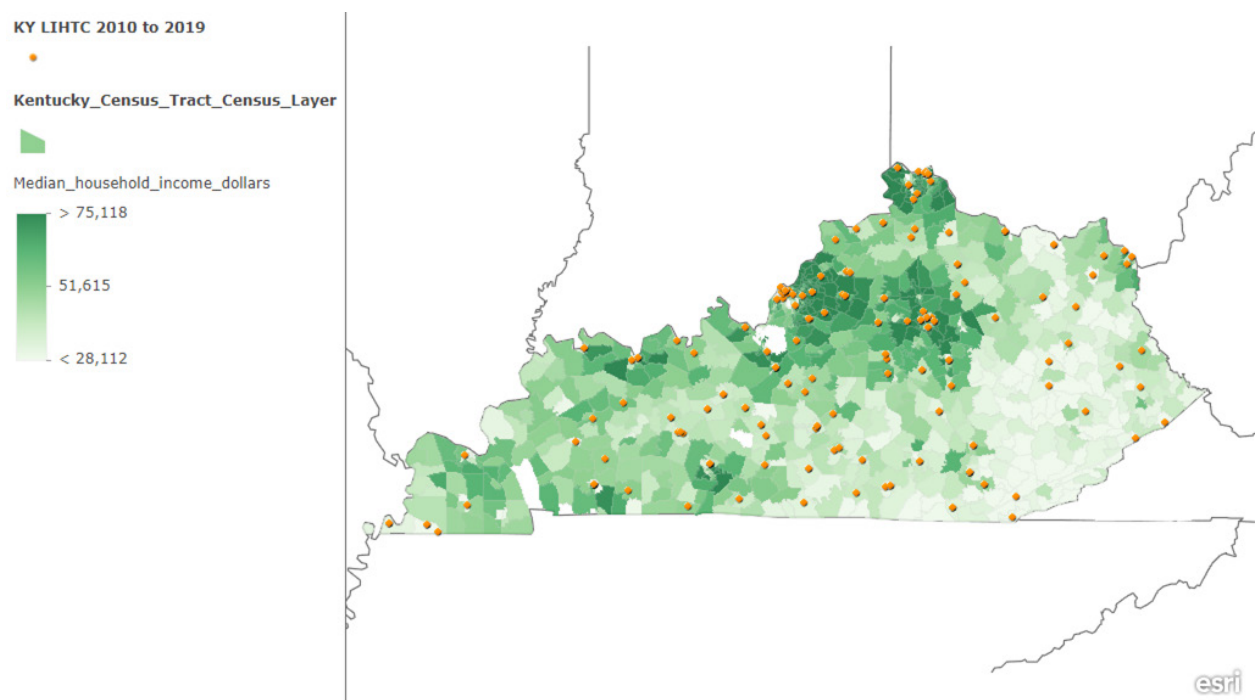
Regardless of these theories, one important component of the federal LIHTC program is incentivizing to build projects in “qualified census tracts” and “difficult development areas.” This has incentivized developers to build in higher poverty areas, skewing the distribution of these projects to low-income areas.<sup>117</sup> A 2019 empirical analysis compared HUD LIHTC data to a “distress index” for each census tract that

combined “cumulative percentage of poverty, adults without a high school education, population on public assistance, female-headed families, and unemployment.”<sup>39</sup> Of all LIHTC units between 1987-2015, a combined 68% were in either “High” or “Very High” distress tracts. The same study found that while predominantly White tracts made up about 44% of all tracts, only about 21% of all LIHTC units were in these tracts.<sup>39</sup>

Narrowing the scope to Kentucky and Louisville Metro, similar patterns can be identified. We conducted a spatial analysis of LIHTC projects and units put in service in Kentucky and Jefferson County from 2010 to 2019 using 2019 ACS 5-year estimates and the HUD National LIHTC database. We found that LIHTC projects and units from these years tend to be concentrated in census tracts that have median household incomes that are 30 to 60 percent of their county’s median income. There are less LIHTC projects in census tracts that have median household incomes at 30% of county median household income or less and in census tracts with median household incomes that are 60% or more of the county’s median household income. Of the 23 total LIHTC projects put into service from 2010-2019 in Jefferson County, 14 of these projects were sited in census tracts with household median incomes between 30%-60% of Louisville-Jefferson County’s median household income. These LIHTC projects combined created a total of 697 units, with 494 designated as low-income units. Compare this to the remaining nine projects sited in tracts at 60% of county median household income and above. These areas added only 459 total units with 393 of those units designated as low-income.

Income category	Number of census tracts	Number of households	Number of projects (project per census tract)	Number of low-income units (low-income units per household)	Number of total units (total units per household)
30% and below (county median household income) tracts	4	3,296	1 (.25)	30 (.009)	30 (.009)
30% to 60% (county median household income) tracts	93	112,060	39 (.419)	1,648 (.015)	1,874 (.017)
60% to 100% (county median household income) tracts	458	724,067	112 (.244)	4,240 (.006)	4,628 (.006)
Above (county median household income) tracts	549	895,191	50 (.091)	1,641 (.002)	1,812 (.002)
Analysis completed using 2019 ACS 5-year estimates for median household income for Kentucky counties and census tracts and the <a href="#">HUD National LIHTC Database</a> . We filtered for projects and units that were put into service from 2010 to 2019. Projects were not included in analysis if they were put in service before this point or if they had missing values.					

**Figure 18:** Analysis of LIHTC Units put into Service between 2010-2019 in Kentucky



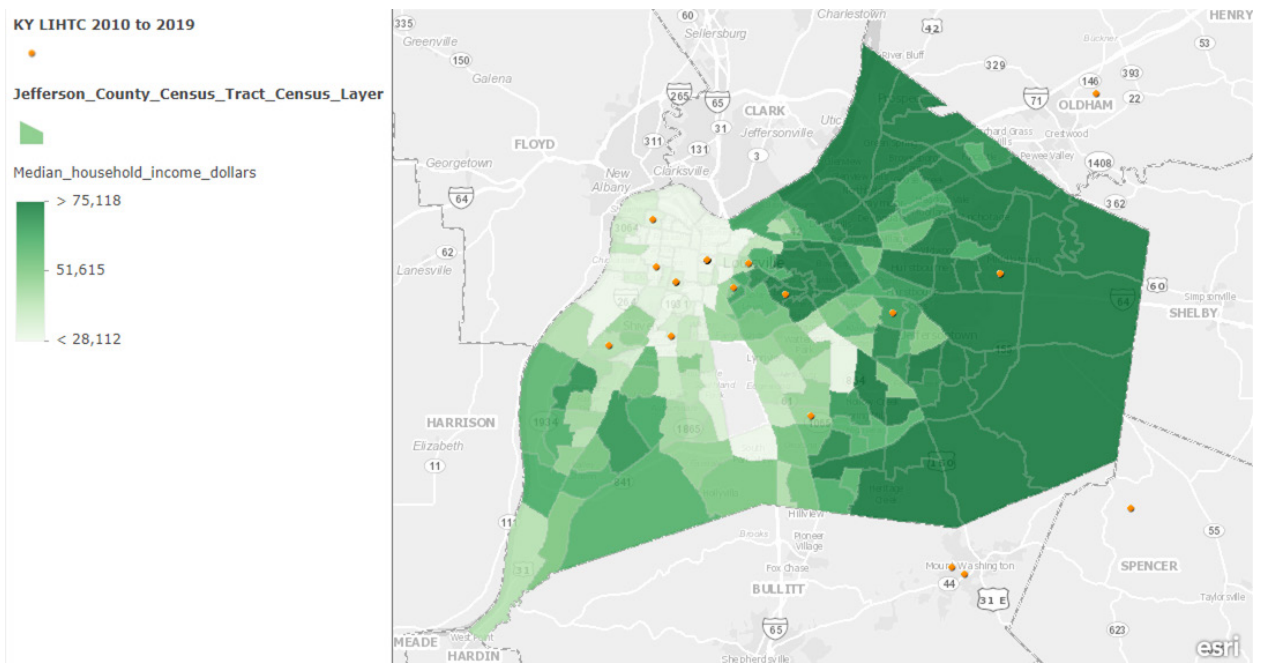
**Figure 19:** LIHTC units put in service between 2010-2019 in Kentucky relative to Median Household Income (by census tract)



Income category	Number of census tracts	Number of households	Number of projects (project per census tract)	Number of low-income units (low-income units per household)	Number of total units (total units per household)
30% and below (county median household income) tracts	3	2,670	0	0	0
30% to 60% (county median household income) tracts	36	42,399	14 (.389)	494 (.012)	697 (.016)
60% to 100% (county median household income) tracts	57	95,415	5 (.088)	278 (.003)	339(.003)
Above (county median household income) tracts	94	172,195	4 (.042)	115 (.001)	115 (.001)

Analysis completed using 2019 ACS 5-year estimates for median household income for Kentucky counties and census tracts and the [HUD National LIHTC Database](#).<sup>118</sup> We filtered for projects and units that were put into service from 2010 to 2019. Projects were not included in analysis if they were put in service before this point or if they had missing values.

**Figure 20:** Analysis of LIHTC Units Put in Service 2010-2019 in Jefferson County



**Figure 21:** LIHTC Units Put in Service 2010-2019 in Jefferson County<sup>118</sup>

## Differences in Neighborhood Site Selection

To understand the economic impact of LIHTC unit development on surrounding areas, one must focus first on the impacts seen in lower-income, higher-poverty areas. Studies reviewing the economic impacts of new LIHTC units on a nearby neighborhood's economic and demographic compositions in higher-poverty areas have found some consistencies.

A 2016 study in Cleveland noted that LIHTC units in low-income neighborhoods had a positive effect on area housing prices.<sup>11</sup> A 2019 Chicago study also recorded increases in home values between 17.6% and 36.8% in lower-income areas, depending on the number of LIHTC projects constructed in a single area.<sup>119</sup> Another 2020 study on the Chicago area found that area home values within a quarter mile of newly built LIHTC units increased by an average of 10.6% above the expected value absent the development, regardless of income area. These spillover effects saw a greater impact primarily in lower-income neighborhoods.<sup>12</sup>



The effect on lower-income neighborhoods may, however, be more complex than simply increasing nearby home values. Evidence suggests that other local market factors can play a more significant role in housing prices. In the 2016 study referenced above, analysis did not observe similar increases in home values in Charlotte, NC as seen in Cleveland, OH. With two very different levels of housing market activity, the research suggests that the addition of LIHTC units benefits surrounding areas in more stagnant markets, but less so in more active markets.<sup>11</sup> A 2019 study in Cleveland, OH also disaggregated the price effects on nearby housing LIHTC projects by projects that had 5 or more and those with less than 5.<sup>119</sup> This showed the higher concentration of LIHTC-designated units within a project has a statistically significant effect on nearby price increases in lower-income areas, but a lower concentration has statistically significant increases in areas with higher-income.<sup>119</sup>

## De-concentration or Displacement?

Along with impacts on housing prices, LIHTC can play a role in de-concentration of poverty, but also gentrification and displacement. While research shows LIHTC developments can create positive effects on nearby home values, it has also demonstrated a need for strategies to prevent displacement in order for lower-income households to benefit from the de-concentration of poverty.<sup>12</sup> A 2020 study of the LIHTC program used an index of factors including housing prices, resident demographics, educational attainment, and income to measure levels of gentrification of an area. The index measured highest among moderate LIHTC investments. Their analysis showed that, though it is not the only contributing factor, LIHTC investments did contribute to gentrification of an area.<sup>120</sup>

One consideration regarding the location of LIHTC units is that if units are placed in an area where there are fewer interested buyers and/or surplus housing stock, the new units may not actually reduce rent compared to the prevailing market rate.<sup>43</sup> Moreover, as the projects age and the buildings depreciate and deteriorate, the difference between the subsidized rent level and the prevailing market rate rent level declines.<sup>43</sup> That is, it becomes more likely that a resident of a subsidized LIHTC unit could find a market-rate unit of comparable quality and cost. This could mean the degree of benefit might start out fairly small and decline over the life of the project.



The other issue that arises from siting projects in lower-demand neighborhoods is that LIHTC residents are less likely to gain the benefits that come from living in “high opportunity” neighborhoods. For some time, federal housing policy has explicitly promoted “poverty de-concentration” as a goal.<sup>121</sup> The idea is that living in more affluent neighborhoods allows residents to access amenities and benefits that are not as accessible in less affluent neighborhoods. While the empirical evidence on the strength of these “neighborhood effects” is quite mixed, policymakers have nevertheless adopted it as a central objective in subsidized housing policy. Historically, LIHTC developments have tended to be located in lower-income neighborhoods, which does not deconcentrate poverty or increase access to amenities that can be found in higher income neighborhoods.<sup>122-124</sup>

Another important factor to consider with poverty de-concentration is a household’s willingness to relocate into an area that does not align with their income level. One study observed that low-income households may seek out neighborhoods with LIHTC units because they can be an attractive destination.<sup>125</sup> However, if the goal is to create more mixed income neighborhoods, it should be acknowledged that higher income families are less likely to move to neighborhoods with new LIHTC projects.<sup>125</sup> LIHTC developments may be useful for increasing nearby home values but are not necessarily effective at creating mixed-income neighborhoods.



## Potential Economic and Fiscal Impacts of Tax Credits

There are at least two broad approaches to assessing whether a particular public policy investment yields positive net benefits. Benefit-cost analysis attempts to identify and quantify the value of all the costs and benefits that flow from a policy decision, including difficult-to-quantify changes, such as reductions in ambient stress levels. Another approach, sometimes called “economic impact analysis,” simply attempts to follow the flows of financial transfers that a policy initiates and to quantify their impact on the economy in the form of job creation, economic growth, and tax receipts. Typically, these economic impact studies make use of a concept called a “multiplier,” where a dollar spent on the program is multiplied by a set factor to estimate the total impact on economic growth. The two analytic approaches are quite different, but both can provide insight into the proposed Kentucky LIHTC.





## Economic Impact Assessments

Economic Impact Assessments on LIHTC units have observed both negative and positive financial impacts on local economies. A model created by the National Association of Home Builders' (NAHB) Housing Policy Department in 2010 using data from across the country estimates that the impact of 100 units of multifamily housing using a LIHTC creates a total local income of \$5,317,500. Disaggregated, this is about \$1,450,500 in local business owner income and \$3,866,700 in wages. This is estimated to bring about \$501,800 in local taxes and supports roughly 80 local jobs.<sup>13</sup> This estimate is just for the process of developing, constructing, and selling the units, but accounts for other services needed to complete this including sales of parts and equipment, transportation, and other professional services such as architecture and engineering. A second similar study, also done by NAHB in 2015, looked at multi-family construction as a whole. This study showed a total local income of \$7,403,000, with business owner income at \$2,750,000, local wages at \$4,652,000, and local tax revenue at \$1,699,000. This calculation estimates that 90 local jobs would be supported.<sup>14</sup>

Two other economic impact analyses of housing tax credit programs conducted in Arizona and Kentucky reach optimistic projections. One is an economic impact analysis of Arizona's Federal LIHTC and its Housing Trust Fund program (a program that is often combined with LIHTCs).<sup>126</sup> That study estimates that over 27 years (1987 to 2014) these two programs have generated \$610.5 million in extra tax receipts for the state of Arizona from construction and operation of the

program and increased spending by subsidized households. Most directly relevant for purposes of this report is an analysis by the same firm of Kentucky's proposed state LIHTC.<sup>16</sup> Utilizing a methodology like that in their Arizona study, the study estimated that the \$120.5 million (\$12.5 mil/year x 10 years) spent on the state LIHTC would yield tax receipts of almost \$800 million over a 34-year time horizon, a significant net benefit.

One economic impact study on state and federal LIHTC on Missouri's economy showed a net loss from tax credit projects.<sup>127</sup> In this study, researchers suggested that the economic growth generated by the construction and operation of the projects was not enough to outweigh the cost of foregone state tax receipts. While federal credits buffered the projects, this set of researchers observed a \$624 million loss over the course of 20 years. Economic impact assessments such as these do not, however, consider the embodied costs of improved health through better quality housing. Such methods, as discussed in the benefit-cost approach, provide a more comprehensive perspective on the impact of affordable housing on the economy.



## Benefit-Cost Approach

A benefit-cost approach is a more complex methodology for reviewing LIHTC projects and would include a larger focus on the health benefits of improved housing stock. Instead of simply following the cash transfers and estimating their direct economic impact, a benefit-cost perspective attempts to also estimate the size and value of the program's impact on recipient and community outcomes.<sup>25,128</sup> Such analyses are limited in number due to their complexity. However, two studies were reviewed for this report. One study argues that utilizing a benefit-cost framework for housing subsidies, though difficult methodologically, would almost certainly find a net positive result for society given the size of the problems that stem from housing cost burden. The report itself, however, does not conduct such an analysis.<sup>25</sup> One rigorous, peer reviewed study of the Section 8 Housing Choice Voucher program in Wisconsin utilized a benefit-cost framework and found the first year of program participation yields an estimated mean net social benefit of \$1,869.00 per recipient, but the size of the estimate is quite sensitive to assumptions.<sup>129</sup> This study does not attempt accounting for long-term costs and benefits that might result from the program.

Decent, affordable, and stable housing has been linked to numerous positive outcomes for individuals, households, and communities. As previously detailed, areas of improvement include physical health, mental health, child development, improved educational achievement and attainment, avoidance of periods of homelessness, and reduced likelihood of involvement in the criminal justice system.<sup>26,130-134</sup> At the community level, many of these individual and household outcomes are also likely to have a positive impact on commerce and economic development.<sup>26,130-134</sup> When an individual's housing needs are met, public outlays for care of the unhoused, health care, and violence are reduced.

A number of studies have estimated the economic and fiscal costs of social problems exacerbated by unaffordable housing. Some estimates of the costs stemming from experiences of homelessness put the social cost at \$35,000-\$150,000 per unhoused person per year. One 2016 study of Indianapolis, IN estimated the annual cost of addressing homelessness in that city alone at almost \$74 million in 2016.<sup>26</sup> Substance use disorder, a condition alleviated by housing, also has a high cost to society. The U.S. Department of Health and Human Services estimated that, in 1999, alcohol and drug abuse cost society \$343 billion.<sup>135-137</sup>



Stable and safe housing is thought to improve educational outcomes for children. Greater educational attainment ultimately yields higher economic returns for the individual and society.<sup>27,138</sup> Estimates of the size of the return to education vary, but one estimate by two prominent education economists puts the lifetime tax loss of the 1.4 million annual high school dropouts in the U.S. at \$180 billion per cohort.<sup>139</sup>

One mediating variable between housing cost burdens and many of these outcomes is lead exposure, a particularly costly environmental hazard related to housing. One study estimates that lowering blood lead content to safe levels for every child in the United States would yield a net social benefit of over \$1 trillion per cohort of children over the course of their lifetimes.<sup>28</sup> Clearly, the myriad of challenges created by unaffordable housing generates a significant cost to society.



### Critiques of LIHTC

One critique of LIHTC programs is that while it does serve a population that needs housing, it does not target the populations whose housing needs are most acute. LIHTC subsidized units are meant to be affordable for a population earning up to 60% of area median income, but the most acute shortage is for housing that is affordable to very low-income households.<sup>140</sup> It should be noted, however, that it is possible for housing voucher recipients to utilize their vouchers in LIHTC properties.

A second critique is that, in the absence of the tax credit program, research suggests many housing units may still have been built. In theory, some of the land and capital that is utilized by LIHTC projects would otherwise have been used for unsubsidized private housing development. Estimates of the degree to which this happens vary and are likely dependent on many factors including the current real estate market, available land, number of developers, and more. LIHTC projects do add to the overall housing stock, but it may not be as simple as a direct addition of the total number of LIHTC units constructed.<sup>39,43</sup>

A third critique is that investments in housing choice vouchers may be a more cost-effective way to relieve housing cost burdens for recipients. Some critics argue that the bulk of the LIHTC subsidy is absorbed to the benefit of the developers rather than the subsidized households.<sup>102</sup> With Housing Choice Vouchers, a much higher proportion of the expenditure would go toward relieving housing cost burden for residents.

### Will the Proposed Kentucky LIHTC Improve Housing Cost Burdens in Kentucky?

The Federal LIHTC has been an active program in Kentucky since 1989. From 1989 to 2019, 847 developments used the credits, adding 27,961 rent-capped units to Kentucky's housing stock. The number of units added per year varies, but from 2015 to 2018, the average was about 800 units per year. Kentucky's proposed LIHTC program would essentially double the size of the tax credit housing expenditure in Kentucky; this likely means the number of units constructed every year would also double.

Kentucky's population of households at 50-60% of AMI do face a challenge in finding safe and decent affordable housing in the private rental market. The precise level of that need is unknown, but earning up to 60% AMI, there is a shortage of 19 affordable units per 100 households. It is likely that the addition of 800 units annually over time would go a long way toward filling the affordability gap for this segment of the population. This may also decrease the number of residents in this income bracket that take up housing that others with lower incomes might otherwise be able to access. However, those that fall below 60% of AMI will continue to have housing barriers. In order to meet the broader housing needs of the state, other programs with particular emphasis on lower income families will be required.



# Recommendations

The main objective of the Kentucky Affordable Housing Tax Credit is to increase the number of affordable housing units available to individuals at home earning up to 60% AMI. While this objective would address a range of health outcomes that result from improved quality housing, it is important to address how the bill would be implemented including how units are designed, located and maintained. Additionally, this research highlights the need for further discussion and investment in housing affordability across the entire continuum of housing needs in Kentucky.

An analysis of the research along with feedback from affordable housing stakeholders led to the development of the following recommendations. Recommendations are not mandates, but instead, measures highlighted to improve the health of Kentucky's residents in need of safe, quality affordable housing.

## Investments in Kentucky's Affordable Housing Market

Expand housing for Kentucky residents earning up to 60% AMI	Expand housing programs for lower income families	Address Rehabilitation vs. New Construction	Invest in retrofits for seniors
Kentucky's affordable housing market for individuals earning up to 60% AMI is insufficient. Tax incentives would help promote construction for a critical part of Kentucky's affordable housing spectrum.	Some of the greatest gaps in housing affordability are for families below 30% AMI. Additional programs and subsidies are needed to extend the health benefits of affordable, stable housing to our most vulnerable Kentuckians.	Incentivize new construction in areas where the population served by LIHTC has the most need and incentivize rehabilitation in areas where existing housing supply for that population is comparably more adequate.	Retrofitting housing for seniors can also allow residents to age in place.

## Design of affordable housing units.

Address sound proofing in affordable housing units.	Address access for those with disabilities.
Some existing affordable housing complexes have little soundproofing between units. The lack of soundproofing can create stress within the home and between neighbors.	Kentucky has a lack of affordable housing units for people with disabilities. Additional accessibility concerns include a lack of ramps for affordable housing locations, and insufficient parking for the number of handicapped units in a development.

## Increase access to and awareness of affordable housing

**Improve outreach around affordable housing options to individuals making less than 60% AMI.**

Affordability may continue to be a concern once an individual has access to a LIHTC unit. Increasing awareness of additional financial support programs may help create stability for individuals with limited incomes.

**Increase communication to improve affordability of housing.**

Public housing and LIHTC run through different funding streams and often different departments both at state and local levels. Increasing communication between these entities and finding ways to improve access and information for residents can help make the continuum of affordable housing more seamless.

**Increase awareness of benefits of affordable housing along the continuum.**

Not all residents are aware of the need for and benefits of affordable housing for all residents. Increasing community awareness of Kentucky's housing needs can help build support for additional programs and developments.

## Ongoing research and evaluation of affordable housing programs

**Expand data available on LIHTC developments.**

Publishing data to examine how developments address environmental factors and evaluating the impacts of including these criteria can help ensure that health benefits are realized.

**Continue to research how affordable housing investments can be best leveraged.**

Within the research, there is not consensus on whether situating LIHTC developments in low-income compared to high-income neighborhoods may yield the most benefits to individuals and communities. There is also more information needed on how to best increase access to affordable housing without creating displacement.





# Discussion

Quality affordable housing plays a critical role in the wellbeing of Kentucky's residents. Affordable housing (where housing costs do not exceed 30% of monthly income) allows families and residents to have enough money to access basic needs including food, medical care, and education.<sup>1-3</sup> Families may move from unhealthy environments with mold and lead paint to one that is clean and free of contaminants.<sup>4,5</sup> Stable housing factors into an individual's mental health and creates stability for a person in recovery with substance use disorder.<sup>6-9</sup> Safe, healthy, housing is also critically important for a child's wellbeing and development.<sup>24</sup>

Research suggests that LIHTC investments can have a positive impact on a community's economic development.<sup>11-14</sup> Employment of construction workers and their related income taxes increased financial activity in the surrounding area. Some questions arise around whether lost tax revenue is made up by other forms of economic activity. Such studies do not, however, address the financial benefits that result from a healthier community. Indeed, communities can spend significant funds meeting the needs of those who are unhoused as well as caring for those with substance use disorder who do not have a place to live.<sup>10,15</sup>

The placement of affordable housing continues to require discussion and reflection. In terms of environmental quality, many LIHTC housing units have been constructed in areas where land was cheaper, but levels of air pollution and exposure to brown fields are higher. At the same time, the question remains whether new housing should be constructed in these same communities where low-income individuals have connection, or if they should be constructed in areas with increased levels of economic activity, resources, and reduced exposure to environmental pollutants. Kentucky's LIHTC program currently incentivizes new developments that reduce environmental exposures and increase connection to transportation and other neighborhood amenities, which may improve the location and associated health impacts of future developments.

Investments in housing for Kentucky's residents earning up to 60% AMI play an important role in reducing the commonwealth's housing crisis. With a current shortfall of 75,000 units for every family seeking housing, the estimated 6,560 additional units from the \$62.5 million (\$12.5 million times 5 years) in tax credits can make an impact.<sup>16</sup> It is important to recognize, however, that Kentucky's housing needs are broad. Among households with AMI's less than 50%, (very low-income), housing cost burden continues to be significant and affordable units are scarce.

Measures to reduce housing disparities also include investments in renovation of existing units. Families often hope to stay in their own homes or neighborhoods and investments in renovations can help seniors age in place. Increased inspections of existing affordable housing units also ensure that units remain healthy for those already housed.



Building investments into Kentucky's affordable housing market is a critical step towards improving the health and wellbeing of the commonwealth's residents. Comprehensive housing investments, including affordable housing tax credits, create positive movement towards the alleviation of Kentucky's housing crisis. Investments in LIHTC have played a role in getting families out of unhealthy, unstable environments into safe, secure, accessible housing. New investments will continue to expand housing opportunities and lay the foundation for a healthier Kentucky.

# Appendix

## 1. Data description / Methodology

2019 American Community Survey Data (ACS) 5-year estimates (downloadable tables: B25070 and B25061) AND 2019 ACS Public Use Microdata Sample 5-year estimates were used to find demographic information about people who are housing cost burdened (a parallel measure of housing insecurity) in Kentucky.

Data was used to calculate shares of households in Kentucky counties who are housing cost burdened (30% or more of housing income on renter costs) and severely housing cost burdened (50% or more of housing income on renter costs).

## 2. Methodology of calculations

The Department of Housing and Urban Development's (HUD) "A Picture of Subsidized Households" data set was used to find the number of public housing and Housing Choice Voucher units in Kentucky and by the Housing Authority of Louisville. The most recent data available were used for the analysis. Selecting Kentucky using HUD's query tool and selecting the public housing and Section 8 programs, the level of annual federal subsidy was calculated using the following formula: average monthly subsidy, times number of units managed, times percent of units occupied, times 12 (months). The same process was then used for the Housing Authority of Louisville.<sup>47</sup>

The Census Bureau's American Community Survey (ACS) allowed us to categorize census tracts across the state using each tracts median household income as a percentage of the statewide median household income, \$50,589.<sup>102</sup> Tracts were separated by Below 30% state median household income, 30%-60% state median household income, 60%-100% state median household income, and above states median household income. Similar categorization was used to categorize census tracts within Jefferson County as a percentage of Jefferson County's median household income, \$56,586.<sup>118</sup>

HUD's LIHTC data query tool allowed us to generate data on Kentucky's recent LIHTC developments.<sup>101</sup> Analysis of LIHTC project siting by household median income used only HUD LIHTC data for projects put into service going back to 2010. This was done to ensure LIHTC project siting was being consistently compared across identically divided census tracts. 2019 5-year ACS estimates were used to compare income across census tracts. HUD LIHTC data was used to compare concentration of units to the Environmental Justice screen. We used data from all years of LIHTC program from 1987 to present.

## 3. Map selection methodology

Counties were chosen based on their percentage of cost burden of renter households. All counties in the state were put into a list split into even thirds (40 counties in each list, based on percentage of renter households which are cost burdened), and the top county from each third was chosen (in addition to Jefferson County).

These environmental maps were drawn from data from the Environmental Protection Agency's (EPA) EJ Screen, an environmental justice tool to map potential risks and hazards across the nation. The data was uploaded into the Louisville/Jefferson County Information Consortium (LOJIC), Louisville Metro's Geographic Information Service (GIS) system. Data was then extracted to highlight Jefferson County and the state at large. The legend for each map can contain negative numbers. These are raw numbers converted from percentiles. A negative number occurs if it is below the U.S. National Average. A positive \*number occurs if it is above the U.S. National Average. The orange circles highlight low-income housing tax credit (LIHTC) projects in Jefferson County. The larger the circle, the more units at that location. LIHTC data was obtained from the U.S. Department of Housing and Urban Development (HUD) data center.



## References:

1. Impact of Affordable Housing on Families and Communities. Homeforallsmc.org. <https://homeforallsmc.org/wp-content/uploads/2017/05/Impact-of-Affordable-Housing-on-Families-and-Communities.pdf>. Published 2021. Accessed December 7, 2021.
2. Coley, R. L. C., Leventhal, T. L., Lynch, A. D. L., & Kull, M. K. MacArthur Foundation. *Poor Quality Housing Is Tied to Children's Emotional and Behavioral Problems*. [https://www.macfound.org/media/files/hhm\\_research\\_brief\\_-\\_september\\_2013.pdf](https://www.macfound.org/media/files/hhm_research_brief_-_september_2013.pdf). Published September 2013. Accessed November 19, 2021.
3. The Lack of Affordable Housing has an Impact on a Family's Health — a Negative One | National Housing Trust. Nationalhousingtrust.org. <https://www.nationalhousingtrust.org/news-article/lack-of-affordable-housing-has-an-impact-on-a-family%E2%80%99s-health-%E2%80%94-a-negative-one>. Published 2021. Accessed December 27, 2021.
4. Garrison VEH, Bachand J, Ashley, PJ. Musty Smells, Mold, and Moisture in the U.S. Housing Stock: Results from Two National Surveys. *Cityscapes*. 2021;23(1):223-236. <https://www.huduser.gov/portal/periodicals/cityscpe/vol23num1/ch8.pdf>. Accessed November 11, 2021
5. Protect Your Family from Sources of Lead. Environmental Protection Agency website. <https://www.epa.gov/lead/protect-your-family-sources-lead#sl-home>. Accessed November 11, 2021
6. Schmitt T, Thornton AE, Rawtaer I, et al. Traumatic Brain Injury in a Community-Based Cohort of Homeless and Vulnerably Housed Individuals. *J Neurotrauma*. 2017;34(23):3301-3310. doi:10.1089/neu.2017.5076
7. Alley DE, Lloyd J, Pagán JA, Pollack CE, Shardell M, Cannuscio C. Mortgage delinquency and changes in access to health resources and depressive symptoms in a nationally representative cohort of Americans older than 50 years. *Am J Public Health*. 2011;101(12):2293-2298. doi:10.2105/AJPH.2011.300245
8. Desmond M, Kimbro R. Eviction's Fallout: Housing, Hardship, and Health. *Social Forces*. 2015. 00(00) 1–30. doi: 10.1093/sf/sov044
9. Liddell C, Guiney C. Living in a cold and damp home: frameworks for understanding impacts on mental well-being. *Public Health*. 2015;129(3):191-199. doi:10.1016/j.puhe.2014.11.007
10. Miller T, Hendrie D. Substance abuse prevention dollars and cents: A cost-benefit analysis. U.S. Department of Health and Human Services. Substance Abuse and Mental Health Services Administration Center for Substance Abuse Prevention. [www.samhsa.gov](http://www.samhsa.gov).
11. Schwartz, A. F., McClure, K., & Taghavi, L. B. (2016). Vouchers and neighborhood distress: The unrealized potential for families with housing choice vouchers to reside in neighborhoods with low levels of distress. *Cityscape*, 18(3), 207–227.
12. Bostic R, Jakabovics A, Voith R, Zielenbach S. Cleveland, Ohio; 2019.
13. Park S, Yang A, Ha HJ, Lee J. Measuring the differentiated impact of new low-income housing tax credit (LIHTC) projects on households' movements by income level within urban areas. *Urban Science*. 2021;5(4):79. doi:10.3390/urbansci5040079
14. Novogradac. Economic Impact of Typical Housing Tax Credit Developments. National Association of Home Builders. [https://www.novoco.com/sites/default/files/atoms/files/nahb\\_jobs-report\\_2010.pdf](https://www.novoco.com/sites/default/files/atoms/files/nahb_jobs-report_2010.pdf) Published March 2010. Accessed December 8, 2021.
15. Jackson, O., & Kawano, L. (2015). Do increases in subsidized housing reduce the incidence of homelessness?: evidence from the low-income housing tax credit.
16. Court D. Economic & fiscal impact summary of proposed state-level affordable housing tax credits. Elliott D. Pollack & Company memo to Kentucky Affordable Housing Coalition. October 15, 2020.)
17. United States Census Bureau. American Community Survey 5-year estimates. Public Use Microdata Samples. <https://data.census.gov/mdat/#/> Accessed 12/29/2021
18. National Low Income Housing Coalition. 2021 Kentucky Housing Profile. [https://nlihc.org/sites/default/files/SHP\\_KY.pdf](https://nlihc.org/sites/default/files/SHP_KY.pdf) Accessed 12/1/2021
19. National Low Income Housing Coalition website. Housing Needs by State: Kentucky. <https://nlihc.org/housing-needs-by-state/kentucky>. Accessed 12/1/2021
20. French, S.A., Tangney, C.C., Crane, M.M. *et al.* Nutrition quality of food purchases varies by household income:

- the SHoPPER study. *BMC Public Health* 19, 231 (2019). <https://doi.org/10.1186/s12889-019-6546-2>
21. D'Alessandro D, Appolloni L. Housing and health: an overview. *Ann Ig.* 2020;32(5 Supple 1):17-26. doi:10.7416/ai.2020.3391
  22. McConnell R, Islam T, Shankardass K, et al. Childhood incident asthma and traffic-related air pollution at home and school. *Environ Health Perspect.* 2010;118(7):1021-1026. doi:10.1289/ehp.0901232
  23. LIHTC Database Access. Office of Housing and Urban Development website. <https://lihtc.huduser.gov/> Accessed December 30, 2021.
  24. Dunn JR. Housing and Healthy Child Development: Known and Potential Impacts of Interventions. *Annu Rev Public Health.* 2020;41:381-396. doi:10.1146/annurev-publhealth-040119-094050
  25. Mitchell DM, McKenzie R. Analysis of the economic effects of low income housing tax credits. *J Bus & Econ Res (JBER).* 2009; 7(8). 61-70. <https://doi.org/10.19030/jber.v7i8.2322>
  26. Carlson D, Miller H, Haveman R, Kang S, Schmidt A, Wolfe B. The effect of housing assistance on student achievement: Evidence from Wisconsin. *J Hous Econ.* 2019;44, 61-73.
  27. Robert Rosenheck et al., "Cost-Effectiveness of Supported Housing for Homeless Persons with Mental Illness," *Archives of General Psychiatry*, September 2003, Vol. 60, No. 9, pp. 940-951.
  28. Levin HM, Rouse CE. The true cost of high school dropouts. *The New York Times*. Jan 25, 2012. <https://www.nytimes.com/2012/01/26/opinion/the-true-cost-of-high-school-dropouts.html>
  29. National Low-Income Housing Coalition. 2021 Kentucky Housing Profile. [https://nlihc.org/sites/default/files/SHP\\_KY.pdf](https://nlihc.org/sites/default/files/SHP_KY.pdf) Accessed 12/1/2021
  30. Definition of health impact assessment (HIA). Center for Disease Control <https://www.cdc.gov/healthyplaces/hia.htm>
  31. How the LIHTC program works. National Housing Law Project website. <https://www.nhlp.org/resources/how-the-lihtc-program-works/> Updated September 7, 2017. Accessed December 1, 2021.
  32. Kentucky Housing Corporation. Qualified Allocation Plan 2021-2022. <https://www.kyhousing.org/Partners/Developers/Multifamily/Documents/2021-2022%20Qualified%20Allocation%20Plan.pdf> . Accessed December 1, 2021.
  33. LIHTC Admissions, Rents and Grievances Procedures. National Housing Law Project website. <https://www.nhlp.org/resources/lihtc-admissions-rents-grievance-procedures/> Updated April 27, 2018. Accessed December 1, 2021.
  34. Affordable housing resource center. Novogradac website. <https://www.novoco.com/resource-centers/affordable-housing-tax-credits/lihtc-basics/about-lihtc> . Accessed December 1, 2021.
  35. Child Welfare Outcomes. U.S. Department for Health and Human Services. <https://cwoutcomes.acf.hhs.gov/cwodatasite/pdf/kentucky.html> last accessed January 6, 2022.
  36. U.S. Department for Health and Human Services. Children's Bureau. NYTD Services and Outcomes Reports. <https://www.acf.hhs.gov/cb/report/nytd-services-and-outcomes-reports> last accessed Dec 23, 2021.
  37. Housing Assistance Council. Veterans Data Central. <https://veteransdata.info/> accessed Dec. 23, 2021
  38. Substance Abuse and Mental Services Administration. National survey of drug use and health: 2018-2019 NSDUH Estimated Totals By State (dataset). US Department of Health and Human Services. Published January 28, 2021. Retrieved December 22, 2021. <https://www.samhsa.gov/data/report/2018-2019-nsduh-estimated-totals-state>
  39. McClure K. What should be the future of the Low-Income Housing Tax Credit program?. *Hous Policy Debate*, 2019;29(1), 65-81.
  40. Freidrichs, C, Woodman B, Freidrichs J, Henry J, Balcom B, Carver S. *The Pruitt-Igoe Myth*. [Video File] New York: First Run Features, 2012. <https://vimeo.com/ondemand/thepruittigoemyth>
  41. Brey J. What is the Faircloth Amendment? Next City website. <https://nextcity.org/urbanist-news/what-is-the-faircloth-amendment>. Published February 9, 2021. Accessed December 08, 2021.
  42. Reid CK. Should we fix what's not broken?. *Hous Policy Debate*, 2019;29(1), 82-84.



43. Burge GS. Do Tenants Capture the Benefits from the Low-Income Housing Tax Credit Program?. *Real Estate Econ.* 2011; 39(1), 71-96.
44. Joint Center for Housing Studies of Harvard University. America's Rental Housing 2020. Published 2020. Accessed 12/6/2021. [https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard\\_JCHS\\_Americas\\_Rental\\_Housing\\_2020.pdf](https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard_JCHS_Americas_Rental_Housing_2020.pdf)
45. 2017 State of Metropolitan Housing Report. Metropolitan Housing Commission. [https://metropolitanhousing.org/wp-content/uploads/2020/10/2017SMHR\\_FINAL\\_Web.pdf](https://metropolitanhousing.org/wp-content/uploads/2020/10/2017SMHR_FINAL_Web.pdf) . Published 2017, Accessed December 8, 2021.
46. State of the Nation's Housing 2021. Joint Center for Housing Studies of Harvard university. [https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard\\_JCHS\\_State\\_Nations\\_Housing\\_2021.pdf](https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard_JCHS_State_Nations_Housing_2021.pdf) Published 2021. Accessed December 6, 2021.
47. U.S. Department of Housing and Urban Development. A Picture of Subsidized Housing data set: 2009-2020. [https://www.huduser.gov/portal/datasets/assths.html#2009-2020\\_query](https://www.huduser.gov/portal/datasets/assths.html#2009-2020_query)
48. Louisville Metro Housing Authority. U.S. Department of Housing and Urban Development Website. [https://www.hud.gov/program\\_offices/public\\_indian\\_housing/programs/ph/mtw/louisville](https://www.hud.gov/program_offices/public_indian_housing/programs/ph/mtw/louisville) . Last updated November 23, 2021. Accessed December 8, 2021
49. US Department of Agriculture. Multifamily Housing Rental Assistance. USDA website. <https://www.rd.usda.gov/programs-services/multifamily-housing-programs/multifamily-housing-rental-assistance>. Accessed 12/8/2021
50. Kentucky Housing Corporation. Annual Impact Report: FY 2019. <https://www.kyhousing.org/Data-Library/Documents/Annual%20Report%20FY2019%20final%20compressed.pdf>. Published 2019. Accessed December 1, 2020.
51. Housing. Louisville-Jefferson County Metro Government website. <https://louisvilleky.gov/government/housing>. Accessed 12/1/2020
52. National Housing Preservation Database. <https://preservationdatabase.org/> Accessed December 28, 2021
53. National income Housing Coalition. *The Problem*. National Low Income Housing Coalition website. <https://nlihc.org/explore-issues/why-we-care/problem>. Published 2021. Accessed November 19, 2021
54. Hernández D, Laird J. Which Americans Face the Greatest Risk of Utility Shut-Offs, and How Do they Cope?. Housing Matters. [https://housingmatters.urban.org/research-summary/which-americans-face-greatest-risk-utility-shut-offs-and-how-do-they-cope?utm\\_source=%20urban\\_newsletters&utm\\_medium=news-HHM&utm\\_term=HHM](https://housingmatters.urban.org/research-summary/which-americans-face-greatest-risk-utility-shut-offs-and-how-do-they-cope?utm_source=%20urban_newsletters&utm_medium=news-HHM&utm_term=HHM). Published 2021. Accessed December 27, 2021.
55. Kneebone E, Decker N, de la Campa E, Herbert C. The Impact of the Pandemic on Landlords: Evidence from Two National Surveys. Jchs.harvard.edu. <https://www.jchs.harvard.edu/research-areas/working-papers/impact-pandemic-landlords-evidence-two-national-surveys> . Published 2021. Accessed December 27, 2021.
56. Gartland E. Families With Children at Increased Risk of Eviction, With Renters of Color Facing Greatest Hardship. Center on Budget and Policy Priorities. <https://www.cbpp.org/blog/families-with-children-at-increased-risk-of-eviction-with-renters-of-color-facing-greatest>. Published 2021. Accessed December 27, 2021.
57. Alvarez, T. and Stefen, B., *Worst Case Housing Needs: 2021 Report to Congress*. Huduser.gov. <https://www.huduser.gov/portal/sites/default/files/pdf/Worst-Case-Housing-Needs-2021.pdf> Published July 2021. Accessed 19 November 2021
58. Jacobs DE. Environmental health disparities in housing. *Am J Public Health.* 2011;101 Suppl 1(Suppl 1):S115-S122. doi:10.2105/AJPH.2010.300058
59. Poblacion, A., Bovell-Ammon, A., & Sheward, R. Stable Homes Make Healthy Families. Children's HealthWatch. <https://childrenshealthwatch.org/wp-content/uploads/CHW-Stable-Homes-2-pager-web.pdf>. Published August 2017. Accessed November 22, 2021
60. About social determinants of health (SDOH). Centers for Disease Control and Prevention website. <https://www.cdc.gov/socialdeterminants/about.html>. Updated March 10, 2021. Accessed December 29, 2021.
61. Morduch J, Schneider R. The USFD Methodology: The financial lives of low-and moderate-income Americans. US Financial Diaries Project Issue Brief, October [www.usfinancialdiaries.org/issue2-method917](http://www.usfinancialdiaries.org/issue2-method917). 2013.

62. Cunningham PJ. Why even Healthy Low-Income People Have Greater Health Risks Than Higher-Income People. The Commonwealth Fund Website. <https://www.commonwealthfund.org/blog/2018/healthy-low-income-people-greater-health-risks> . Published September 27, 2018. Accessed December 29, 2021.
63. Lew, I. *Housing Inadequacy Remains a Problem for the Lowest-Income Renters*. Joint Center for Housing Studies Website. <https://www.jchs.harvard.edu/blog/housing-inadequacy-remains-a-problem-for-the-lowest-income-renters>. Published May 19, 2016. Retrieved November 11, 2021.
64. Adamkiewicz G, Spengler JD, Harley AE, et al. Environmental conditions in low-income urban housing: clustering and associations with self-reported health. *Am J Public Health*. 2014;104(9):1650-1656. doi:10.2105/AJPH.2013.301253
65. *WHO Guidelines for Indoor Air Quality: Dampness and Mould*. Geneva: World Health Organization [https://www.ncbi.nlm.nih.gov/books/NBK143941/pdf/Bookshelf\\_NBK143941.pdf](https://www.ncbi.nlm.nih.gov/books/NBK143941/pdf/Bookshelf_NBK143941.pdf) . Published 2009, Accessed November 11, 2021
66. Riggs L, Keall M, Howden-Chapman P, Baker MG. Environmental burden of disease from unsafe and substandard housing, New Zealand, 2010-2017. World Health Organization. Published 2021. Accessed November 11, 2021.
67. Swope CB, Hernández D. Housing as a determinant of health equity: A conceptual model. *Soc Sci Med*. 2019;243:112571. doi:10.1016/j.socscimed.2019.112571
68. Needleman HL. The persistent threat of lead: a singular opportunity. *Am J Public Health*. 1989;79(5):643-645. doi:10.2105/ajph.79.5.643
69. Egan KB, Cornwell CR, Courtney JG, Ettinger AS. Blood Lead Levels in U.S. Children Ages 1-11 Years, 1976-2016. *Environ Health Perspect*. 2021;129(3):37003. doi:10.1289/EHP7932
70. Improving housing quality and safety. Local Housing Solutions website. <https://local housingsolutions.org/policy-objectives/improving-housing-quality-and-safety/>. Accessed December 8, 2021.
71. Heat Island Impacts. Environmental Protection Agency Website. <https://www.epa.gov/heatislands/heat-island-impacts>. Updated September 15, 2021. Accessed November 12, 2021.
72. Berko J, Ingram DD, Saha S, Parker JD. Deaths attributed to heat, cold, and other weather events in the United States, 2006-2010. *Natl Health Stat Report*. 2014;(76):1-15.
73. Voelkel J, Hellman D, Sakuma R, Shandas V. Assessing Vulnerability to Urban Heat: A Study of Disproportionate Heat Exposure and Access to Refuge by Socio-Demographic Status in Portland, Oregon. *Int J Environ Res Public Health*. 2018;15(4):640. Published 2018 Mar 30. doi:10.3390/ijerph15040640. Accessed November 12, 2021.
74. Hernández D. Understanding 'energy insecurity' and why it matters to health. *Soc Sci Med*. 2016;167:1-10. doi:10.1016/j.socscimed.2016.08.029
75. Stone B, Lanza K, Mallen E, Vargo J, Russell A. Urban Heat Management in Louisville, Kentucky: A Framework for Climate Adaptation Planning. *Journal of Planning Education and Research*. October 2019. doi:10.1177/0739456X19879214
76. Basner M, Babisch W, Davis A, et al. Auditory and non-auditory effects of noise on health. *Lancet*. 2014;383(9925):1325-1332. doi:10.1016/S0140-6736(13)61613-X
77. Elmenhorst EM, Elmenhorst D, Wenzel J, et al. Effects of nocturnal aircraft noise on cognitive performance in the following morning: dose-response relationships in laboratory and field. *Int Arch Occup Environ Health*. 2010;83(7):743-751. doi:10.1007/s00420-010-0515-5
78. Basner M, Müller U, Elmenhorst EM. Single and combined effects of air, road, and rail traffic noise on sleep and recuperation. *Sleep*. 2011;34(1):11-23. Published 2011 Jan 1. doi:10.1093/sleep/34.1.11
79. Dragano N, Hoffmann B, Moebus S, et al. Traffic exposure and subclinical cardiovascular disease: is the association modified by socioeconomic characteristics of individuals and neighbourhoods? Results from a multilevel study in an urban region. *Occup Environ Med*. 2009;66(9):628-635. doi:10.1136/oem.2008.044032
80. Liu W, Zhang Y, Yu CM, et al. Current understanding of coronary artery calcification. *J Geriatr Cardiol*. 2015;12(6):668-675. doi:10.11909/j.issn.1671-5411.2015.06.012
81. Gunier RB, Hertz A, Von Behren J, Reynolds P. Traffic density in California: socioeconomic and ethnic differences among potentially exposed children. *J Expo Anal Environ Epidemiol*. 2003;13(3):240-246. doi:10.1038/sj.jea.7500276



82. Common types of brownfields and their contaminants. Environmental Protection Agency Website. <https://www.epa.gov/brownfields/common-types-brownfields-and-their-contaminants> Accessed Dec. 9, 2021
83. Lodge, E.K., Engel, L.S., Ferrando-Martínez, S. *et al.* The association between residential proximity to brownfield sites and high-traffic areas and measures of immunity. *J Expo Sci Environ Epidemiol* 30, 824–834 (2020). <https://doi.org/10.1038/s41370-020-0226-2>
84. Mueller, A.R. and Dutta, U., Brownfields and Children under 18 in Detroit. *David Publishing Company www.davidpublisher.com*, 15, pp.17-27. Published 2021. Accessed November 11, 2021
85. Lee, C. *Environmental justice, urban revitalization, and brownfields: The Search for Authentic Signs of Hope*. Public Dialogues - Brownfields. <https://19january2021snapshot.epa.gov/sites/static/files/2015-02/documents/public-dialogue-brownfields-1296.pdf>, Published July, 1996. Retrieved November 1, 2021,
86. Morello-Frosch R, Zuk M, Jerrett M, Shamasunder B, Kyle AD. Understanding the cumulative impacts of inequalities in environmental health: implications for policy. *Health Aff (Millwood)*. 2011;30(5):879-887. doi:10.1377/hlthaff.2011.0153
87. Maqbool N, Viveiros J, Ault, M. The Impacts of Affordable Housing on Health: A Research Summary. <https://www.rupco.org/wp-content/uploads/pdfs/The-Impacts-of-Affordable-Housing-on-Health-CenterforHousingPolicy-Maqbool.etal.pdf> Published April 2015. Accessed November 20, 2021.
88. Maness DL, Khan M. Care of the homeless: an overview. *Am Fam Physician*. 2014;89(8):634-640
89. Krieger J, Higgins DL. Housing and health: time again for public health action. *Am J Public Health*. 2002;92(5):758-768. doi:10.2105/ajph.92.5.758
90. Singh A, Daniel L, Baker E, Bentley R. Housing Disadvantage and Poor Mental Health: A Systematic Review. *Am J Prev Med*. 2019;57(2):262-272. doi:10.1016/j.amepre.2019.03.018
91. Stahre M, VanEenwyk J, Siegel P, Njai R. Housing Insecurity and the Association With Health Outcomes and Unhealthy Behaviors, Washington State, 2011. *Prev Chronic Dis* 2015;12:140511. DOI: <http://dx.doi.org/10.5888/pcd12.140511>
92. Bentley R, Baker E, Mason K, Subramanian SV, Kavanagh AM. Association between housing affordability and mental health: a longitudinal analysis of a nationally representative household survey in Australia. *Am J Epidemiol*. 2011;174(7):753-760. doi:10.1093/aje/kwr161
93. Jelleyman, Tim & Spencer, Nicholas. (2008). Residential mobility in childhood and health outcomes: A systematic review. *Journal of epidemiology and community health*. 62. 584-92. 10.1136/jech.2007.060103.
94. Hyndman SJ. Housing dampness and health amongst British Bengalis in east London. *Soc Sci Med*. 1990;30(1):131-141. doi:10.1016/0277-9536(90)90336-q
95. Coley R, Levanthal T, Lynch A, and Kull M. Relations Between Housing Characteristics and the Well-Being of Low-Income Children and Adolescents. *Developmental Psychology*. 2013; 49 (9): 1775–1789.
96. Robison J, Schensul J, Coman E, et al. "Mental Health in Senior Housing: Racial/Ethnic Patterns and Correlates of Major Depressive Disorder." *Aging & Mental Health*. 2009;13(5): 659–673.
97. U.S. Department of Housing and Urban Development. Family Options Study: 3-Year Impacts of Housing and Services Interventions for Homeless Families. <https://www.huduser.gov/portal/sites/default/files/pdf/Family-Options-Study-Full-Report.pdf>. Published October 2016. Accessed December 3, 2021.
98. Simon AE, Fenelon A, Helms V, Lloyd PC, Rossen LM. HUD Housing Assistance Associated With Lower Uninsurance Rates And Unmet Medical Need. *Health Aff (Millwood)*. 2017;36(6):1016-1023. doi:10.1377/hlthaff.2016.1152
99. Kyle T, Dunn JR. Effects of housing circumstances on health, quality of life and healthcare use for people with severe mental illness: a review. *Health Soc Care Community*. 2008;16(1):1-15. doi:10.1111/j.1365-2524.2007.00723.x
100. Newman S, Holupka CS. Housing Affordability And Children's Cognitive Achievement. *Health Aff (Millwood)*. 2016;35(11):2092-2099. doi:10.1377/hlthaff.2016.0718
101. United States Census Bureau. 2019 American Community Survey 1 year estimates. <https://data.census.gov/cedsci/table?q=income%20by%20state&g=0400000US21&tid=ACST1Y2019.S1901> Accessed 12/1/2021

102. United States Census Bureau. American Community Survey narrative profiles: 2015-2019 ACS 5-year narrative profile: Kentucky. <https://www.census.gov/acs/www/data/data-tables-and-tools/narrative-profiles/2019/report.php?geotype=state&state=21> Accessed 11/30/2021
103. National Low Income Housing Coalition. 2021 Kentucky Housing Profile. [https://nlihc.org/sites/default/files/SHP\\_KY.pdf](https://nlihc.org/sites/default/files/SHP_KY.pdf) Accessed 12/1/2021
104. Joint Center for Housing Studies of Harvard University. America's Rental Housing 2020. Published 2020. Accessed 12/6/2021. [https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard\\_JCHS\\_Americas\\_Rental\\_Housing\\_2020.pdf](https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard_JCHS_Americas_Rental_Housing_2020.pdf)
105. Wegmann J. Death to single-family zoning... and new life to the missing middle. *J Am Plann Assoc* 2020;86(1):113-119.
106. Baer WC, Williamson CB. The filtering of households and housing units." *Journal of Planning Literature* 1988; 3(2). 127-152.
107. US Department of Housing and Urban Development Office of Policy Development and Research. Impacts of filtering and rent control on housing supply. PD&R Edge: An Online Magazine. Published June 15, 2020. Accessed December 20, 2021. <https://www.huduser.gov/portal/pdredge/pdr-edge-featd-article-061520.html>
108. Rosenthal SS. Are private markets and filtering a viable source of low-income housing? estimates from a "repeat income" model. *Am Econ Rev*. 2014; 104(2). 687-706. DOI: 10.1257/aer.104.2.687
109. Marçal KE, Maguire-Jack K. Housing insecurity and adolescent well-being: Relationships with child welfare and criminal justice involvement. *Child Abuse Negl*. 2021;115:105009. doi:10.1016/j.chiabu.2021.105009
110. Damiano A, Frenier C. Build Baby Build?: Housing Submarkets and the Effects of New Construction on Existing Rents. [www.tonydamiano.com](http://www.tonydamiano.com). <https://www.tonydamiano.com/project/new-con/bbb-wp.pdf>. Published October 16, 2020.
111. Supply Shock Versus Demand Shock: The Local Effects of New Housing in Low-Income Areas [https://research.upjohn.org/cgi/viewcontent.cgi?article=1334&context=up\\_workingpapers](https://research.upjohn.org/cgi/viewcontent.cgi?article=1334&context=up_workingpapers)
112. Do Property Tax Incentives for New Construction Spur Gentrification? Evidence from New York City [https://asit-prod-web1.cc.columbia.edu/econdept/wp-content/uploads/sites/41/2019/07/Singh\\_JMP.pdf](https://asit-prod-web1.cc.columbia.edu/econdept/wp-content/uploads/sites/41/2019/07/Singh_JMP.pdf)
113. Mendenhall R, DeLuca S, Duncan G. Neighborhood resources, racial segregation, and economic mobility: Results from the Gautreaux program. *Social Science Research*. 2006 Dec 1;35(4):892-923.
114. Rosenblatt P, DeLuca S. "We Don't Live Outside, We Live in Here": Neighborhood and Residential Mobility Decisions among Low-Income Families. *City & Community*. 2012 Sep;11(3):254-84.
115. Scally CP, Tighe JR. Democracy in action?: NIMBY as impediment to equitable affordable housing siting. *Housing Studies*. 2015 Jul 4;30(5):749-69.
116. Joseph ML. "Cityscape" Mixed-Income Symposium Summary and Response: Implications for Antipoverty Policy. *Cityscape*. 2013 Jan 1:215-21.
117. Imbroscio D. Beyond mobility: The limits of liberal urban policy. *Journal of Urban Affairs*. 2012 Feb 1;34(1):1-20.
118. United States Census Bureau. American Community Survey 5-year Estimates. Jefferson County, Kentucky Income in Past 12 Months. <https://data.census.gov/cedsci/table?q=s1903&g=05000000US21111&tid=ACSST5Y2019.S1903>.
119. Woo A, Joh K, Van Zandt S. Unpacking the impacts of the low-income housing tax credit program on nearby property values. *Urban Studies*. 2016;53(12):2488-2510. doi:10.1177/0042098015593448
120. Voith R, Liu J, Zielenbach S, et al. The effects of concentrated LIHTC development on surrounding house prices. *SSRN Electronic Journal*. 2020. doi:10.2139/ssrn.3740758
121. Shell J, Morrison DR. The low income housing tax credit: Affordable housing producer or gentrification generator? 2020.
122. Khadduri J. Deconcentration: What do we mean? What do we want? *Cityscape*. 2001; 5(2). 69-84 <https://www.huduser.gov/Periodicals/CITYSCPE/VOL5NUM2/khadduri.pdf>. Accessed December 5, 2021.
123. Ludwig J, Duncan GJ, Gennetian LA, Katz LF, Kessler RC, Kling JR, Sanbonmatsu L. Long-term neighborhood effects on low-income families: Evidence from Moving to Opportunity. *Am Econ Rev*. 2013;103(3) 3. 226-31.



124. Clampet-Lundquist S, Massey DS. Neighborhood effects on economic self-sufficiency: A reconsideration of the Moving to Opportunity experiment. *Am J Sociol.* 2008;114(1).107-143.
125. Sharkey P, Faber JW. Where, when, why, and for whom do residential contexts matter? Moving away from the dichotomous understanding of neighborhood effects. *Annu Rev Sociol.* 2014; 40:559-579.
126. Elliot D. Pollack & Company. Arizona low income housing tax credit and housing trust fund economic and fiscal impact report. Arizona Department of Housing website. [https://housing.az.gov/sites/default/files/documents/files/Arizona%20LIHTC%20EF\\_FINAL\\_0.pdf](https://housing.az.gov/sites/default/files/documents/files/Arizona%20LIHTC%20EF_FINAL_0.pdf) Published January 2014.
127. Mitchell DM, McKenzie R. Analysis of the economic effects of low income housing tax credits. *J Bus & Econ Res* (JBER). 2009; 7(8). 61-70. <https://doi.org/10.19030/jber.v7i8.2322>
128. Diamond M. The costs and benefits of affordable housing: a partial Solution to the conflict of competing goods. *Geo.. J Poverty Law & Policy;* 2019; 27(2), 231-260
129. Crowley DM, Dodge KA, Barnett WS, et al. Standards of evidence for conducting and reporting economic evaluations in prevention science. *Prev Sci.* 2018; 19(3). 366-390.
130. Carlson D, Haveman, R, Kaplan, T, Wolfe, B. The benefits and costs of the Section 8 housing subsidy program: A framework and estimates of first-year effects. *J Policy Anal Manage.* 2011; 30(2), 233-255.
131. Gabriel, S, & Painter G. Why affordability matters. *Reg Sci and Urban Econ.* 2020; 80; 103378. <https://doi.org/10.1016/j.regsciurbeco.2018.07.001>
132. Pomerory S, Marquis-Bissonnette M. Non-housing Outcomes of affordable housing. Focus Consulting Inc, Carleton University Centre for Urban Research and Education (CURE), and Canada Mortgage and Housing Corporation. [https://carleton.ca/cure/wp-content/uploads/Non\\_Housing\\_Outcomes\\_of\\_Affordable\\_Housing.pdf](https://carleton.ca/cure/wp-content/uploads/Non_Housing_Outcomes_of_Affordable_Housing.pdf). Published March, 2016.
133. Chetty R. Affordable housing as a pathway to economic opportunity. Testimony Before the House Financial Services Committee. U.S. House Committee on Financial Services website. <https://financialservices.house.gov/uploadedfiles/hhrg-117-ba00-wstate-chettyr-20211021.pdf> Published October 21, 2021.
134. Freedman M, Owens EG. (2011). Low-income housing development and crime. *J Urban Econ.* 2011;70(2-3), 115-131.
135. Harwood H. Updating estimates of the economic costs of alcohol abuse in the United States: Estimates, update methods, and data. National Institute on Alcohol Abuse and Alcoholism. Published 2000. Accessed 11/30/2021. <https://pubs.niaaa.nih.gov/publications/economic-2000/>
136. NIDA. The Economic Costs of Alcohol and Drug Abuse in the United States - 1992. National Institute on Drug Abuse website. <https://archives.drugabuse.gov/publications/economic-costs-alcohol-drug-abuse-in-united-states-1992>. September 1, 1998. Accessed November 30, 2021.
137. Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2008. DHHS Pub. No. (SMA) 07-4298. <https://www.samhsa.gov/sites/default/files/cost-benefits-prevention.pdf>
138. Carneiro,P, Heckman JJ, Vytlacil EJ. Estimating marginal returns to education. *Am Econ Rev.* 2011; 101(6), 2754-81.
139. Ashenfelter O, Krueger AB. Estimates of the economic return on schooling from a new sample of twins. *Am Econ Rev.* 1994; 84 (5):1157–1173 .
140. Edwards C, Calder VB. Low- Income Housing Tax Credit: Costly, Complex, and Corruption- Prone. *Cato Institute Tax and Budget Bulletin*, 2017;(79).
141. Kentucky Housing Corporation. Low Income Housing Tax Credi Properties. <https://public.tableau.com/app/profile/kentucky.housing.corporation/viz/HistoricalLIHTCDashboard/HistoricalLIHTCDashboard>. Published September, 2019. Accessed January, 12, 2022